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Commandant's NOTE

MAJOR GENERAL MICHAEL F. SPIGELMIRE Chief of Infantry

MORTARS AND THE COMBINED ARMS TEAM

The concept of mortars as a vital part of the combined arms team has come under attack recently, and those who oppose it usually advance two arguments:

- Mortars are not as lethal as artillery and therefore amount to little more than second-class fire support weapons.
- Because the Army will probably have to operate with fewer resources in the future than it has today, it must streamline all of its organizations, including its mortar units, and keep only the most effective ones.

In view of this interest, we at the Infantry School have reviewed our mortar program and mortar organizations. One fact is quite clear to us—mortars are still a vital and necessary component of the combined arms team. We feel that today's mortar systems, organizations, and ammunition can make a significant contribution to success in combat.

The most basic fact to consider is that the presence of mortars in every maneuver battalion gives the commanders responsive indirect fires with which to fight a combined arms battle. This supports our doctrine by allowing the commanders at higher levels to mass or shift other forms of fire support without totally depriving any unit of the fire support it needs.

Mortars complement the other forms of fire support in several ways: They are the most responsive form of fire support; they are extremely lethal against soft targets such as infantry; they can be used in even the most restricted terrain; their short minimum range makes them ideal for providing close-in protective fires; and they are easy to conceal and protect.

The relative size of the weapons and the weight of the ammunition have obvious strategic transport advantages over artillery weapons. For instance, a 107mm mortar round weighs 22 pounds while a 105mm howitzer round weighs 45 pounds. The mortar round has much the same effect against personnel targets as the artillery round and offers better suppressive effects. In addition, less than half the manpower is needed per tube, and man transportability provides many tactical advantages. As many of us learned in Vietnam, mortars can be secretly moved into position to support surprise attacks.

In recent years, the Army has made several improvements in the mortar weapon systems that make them even more effective. Materiel improvements include the M224 60mm mortar, which has been fielded to all Active Army and roundout Army units, and the M252 improved 81mm (I81mm) mortar, also fielded to most of these units. Both systems offer greater range, better accuracy, and more lethality than their predecessors.

The 120mm mortar will be fielded in two versions, a towed system and a carrier system. The towed system is scheduled to be fielded to the 9th Motorized Brigade in Fiscal Year 1991, while the carrier system is to be fielded in Fiscal Year 1994. The 120mm not only has operational commonality with the other mortar systems, it offers the same advantages over its predecessors as the smaller mortars. It also has a far better potential for future improvements.

New ammunition upgrades for the 60mm mortar include high explosive (HE), smoke, illuminating, and short range training rounds. The HE cartridge is now in the inventory, and the smoke and short-range training rounds are scheduled to be fielded in Fiscal Year 1991. (Because of budget constraints and a large stockpile of old 60mm ammunition, a limited purchase of the new illumination rounds is scheduled for Fiscal Year 1991.)

The new family of ammunition for the I81mm mortar (M252) includes HE, smoke, illumination, short range and long range training rounds. The fielding of the new HE round is in progress; the smoke round and a limited number of illumination rounds are scheduled for fielding during Fiscal Year 1991. With reduced charges, the new ammunition can be used with the old M29A1 mortar as well.

The new family of improved ammunition for the 120mm mortar—HE, smoke, illumination, and short range training rounds—will be fielded with the carrier system in Fiscal Year 1994. (The improved illumination and training rounds will be developed but will not be fielded.)

At the same time, we at the Infantry School are working to reduce the complexity, number, and type of mortar fuzes. Our goal is to have only three fuzes for all mortar applications. All new 60mm, 81mm, and 120mm ammunition, for example, will already be fuzed when it is fielded. The fuze for the HE rounds will be the M734 multi-option fuze, which can be set by hand. The other fuzes are a point detonating fuze for the 60mm smoke cartridge and a precision time fuze for illuminating cartridges and the 81mm smoke cartridge.

The fielding of the mortar ballistic computer (MBC) has greatly improved the speed and accuracy of fire direction center (FDC) operations. The MBC upgrade for the new 60mm and 81mm ammunition is scheduled to be completed this year, while the 120mm mortar ammunition software will be available along with the improved ammunition.

Another developmental action being considered is the application of existing or emerging field artillery technology to mortars to increase their accuracy, survivability, and responsiveness.

For the near term, we are looking at low cost, low risk, and existing technology including: The use of the Global Positioning System to provide continuous accurate position updates, the use of a north-finding module to provide a mounting azimuth, and an adaptation of the Field Artillery's M1 collimator to eliminate the need for aiming stakes and the associated tasks. Our far term efforts will focus on five major areas of improvement: survivability, responsiveness, mobility, accuracy, and lethality. Within each area of improvement, a long term concept is being formulated that will address the materiel needs within that area.

In addition to these improvements, the Infantry School has made some organizational improvements in the heavy battalion mortar platoons, increasing the number of mortars in them from four to six tubes to provide greater firepower and flexibility.

We also increased the rank structure within the heavy mortar platoon to ensure that mortarmen have the level of experience and training they will need to meet the additional responsibilities of a larger unit and of routine split-section operations. The platoon sergeant is now a master sergeant, the section leaders are sergeants first class, and the chief computer is a staff sergeant. Further, to provide an understanding of mortar training, maintenance, and employment within the company headquarters, the first sergeants of many infantry battalion headquarters companies have also been coded MOS 11C (mortarman).

There are other areas that need improvement, one of which is training.

Our best picture of the current state of mortar training comes from the exercises conducted at the National Training Center (NTC) and the Joint Readiness Training Center (JRTC). Other training exercises, recent mortar tests, and results of skill qualification tests provide additional insights. Our conclusion is that although the performance of mortar crews in units seems adequate, the tactical employment of mortars needs improvement.

The major problem we see at the training centers is that mortars are simply not used enough. Leaders and fire support elements do not call for mortar support even when there are targets and no artillery support is available. In fact, they request field artillery fires more than six times as often as mortar fires.

The lack of calls for fire may be partly due to certain limitations in the training centers themselves. Both the NTC and the JRTC have difficulty portraying the full effects of suppression. It is therefore difficult to conduct effective training in adjusting mortar fires. Too, a limitation during live fire exercises is the prohibition against firing mortars over the heads of friendly forces.

Home station limitations also undoubtedly add to this general tendency. Too often, mortars train independently rather than as part of the maneuver team. When they do train in unit exercises, it is difficult to show how their fires contribute to maneuver success. It is also difficult for the effectiveness of the entire mortar team to be evaluated objectively enough to serve as a basis for improvement.

If mortar training is to be effective, it must include all of the elements of the mortar fire team—the commander, the mortar headquarters, the mortar squads, the FDC, and the fire support team (FIST) and forward observer (FO)—and each must be properly trained.

Unfortunately, in the past the STRAC standards for mortars have contributed to incomplete training. The 1988 standards, for instance, required only that squad leaders and gunners pass the gunner's examination and that the unit obtain a satisfactory rating on an external evaluation. Now, however, the 1990 version of STRAC not only highlights the training requirements for the entire mortar team, it also emphasizes combined arms operations and expands and clarifies the standards. It still requires a gunner's examination but has added a requirement for a fire direction center examination for FDC personnel, section leaders, and squad leaders. Additionally, the external evaluation now requires both live fire and force-on-force operations as part of a company or battalion maneuver field training exercise.

At the Infantry School, we are working on our courses and doctrinal products to improve mortar training performance. The Advanced NCO Course will be tracked in Fiscal Year 1991, and half of the program of instruction will be MOS 11C specific. An exportable Infantry Mortar Platoon Course and a Skill Level 2 FDC course are being developed and will be available in Fiscal Year 1991.

To promote simplicity and standardization, we have consolidated the various doctrinal and training references for all types of mortars into as few source documents as possible. Our current Army Readiness and Training Evaluation Program (ARTEP) products include all mortars in just two publications—ARTEP 7-90-MTP (mission training plan) and ARTEP 7-90 DRILL. The training and evaluation outlines in the MTP are written so that they apply to any type of mortar or mortar organization, while the more technical drill book incorporates the crew and battle drills into separate actions by type of mortar.

We are also consolidating the current mortar field manuals into just three publications—FM 23-90, Mortars, now in final draft; FM 7-90, Tactical Employment of Mortars; and FM 23-91, Mortar Gunnery. The mortar gunnery manual will include an FDC examination. We are also revising FM 7-10, Infantry Rifle Company, and 7-20, The Infantry Battalion, and they will include mortars in greater detail. All of these manuals will include the equipment and organizational changes mentioned above and the latest lessons learned. When completed, they, along with the current generation of CMF 11 Soldiers Manuals, will form a complete set of doctrinal and training references for mortars.

The success of mortars on the battlefield of the future will not result solely from the technological and materiel changes under development, although these will help. That success will only come from hard, realistic training and from the effective understanding and employment of mortars by all the leaders of the combined arms team.

INFANTRY LETTERS

LIGHT TO MECH

Captain Thomas E. Fish, in his article "The Infantry Spectrum: Crossing from Light to Mech" (January-February 1990, pages 39-41), is right on target in his discussion of the transition from the world of light infantry to the world of heavy.

My own experience tracks perfectly with his. After six years of airborne and Special Forces assignments, I was assigned as an armored cavalry troop commander in Germany. As with Captain Fish, I did not have the luxury of a "break-in" period, or of an assignment such as assistant S-3. I would therefore like to reinforce his excellent points with a few of my own:

First, beware of the trap of dragging along the esprit and traditions of your previous unit. Although your service in that unit should be a source of personal pride, your first loyalty must be to the troops of your new unit. I'm not saying you should hide your past associations. But if your soldiers perceive that they are not your "first love," you will lose credibility with them and with that will go their loyalty to you. Remember that loyalty goes down the chain of command as well as up, and that ours is a big Army with proud units full of great traditions.

Second, if at all possible, attend the Motor Officers Course at Fort Knox. It concentrates on "hands-on" in the strictest sense. Not only will it greatly improve your technical proficiency, it will also reinforce your self-confidence as you step into your mechanized infantry motor pool for the first time.

Finally, instead of trying to remain in a light unit, seek a mechanized infantry assignment. (When I was an airborne battalion commander, I was often asked for career advice by officers leaving the battalion for an officer advanced course. Mostly, they wanted me to help get them round-trip tickets.)

Heavy-light and light-heavy operations are on the schedule at the Combat Training Centers, and they were habitually used in Panama on Operation JUST CAUSE. The amalgamation of those units presents a significant challenge, and officers who have served in both light and heavy units—and who thoroughly understand the strengths and weaknesses of each—are particularly adept at leading such mixed forces. My armored cavalry experience, which I saw as the deathknell to my career at the time, proved absolutely invaluable years later when I conducted combined arms training with light-heavy forces.

Regardless of the current perception among many lieutenants and captains as to the negative career effect of "crossing from light to mech," I encourage them to do just that—and from mech to light as well.

MARSHALL L. HELENA
LTC, Infantry
Fort Leavenworth, Kansas

NOSTALGIA TIME

I thoroughly enjoyed Colonel Hillman's observations concerning the Army uniform in the decade before World War II ("The 8th Infantry Detraining," by Colonel Rolfe L. Hillman, Jr., INFANTRY, January-February 1990, pages 32-36).

Certainly that uniform was neither practical nor appealing. But I was amazed that, despite their skimpy earnings, so many soldiers found ways to improve on the Government issue—the three pleats on the back of the O.D. shirt that gave it a tighter more form-fitting appearance; the tailoring of the breeches to reduce their bagginess; the leggins wrapped in a precisely molded fashion; and finally the reblocked, flattened campaign hat.

To me, the 8th Infantry soldiers depicted in the article, with their rifles loosely slung and their hats set at a jaunty angle and appearing not to have a care in the world beyond the next chow line, personify the seasoned "regular" infantryman as I knew him in that now dimly distant period.

The pictures in the article attracted me for another reason. In 1935, while a member of the 29th Infantry at Fort Benning, I was detailed to give the soldiers of the 8th Infantry Regiment's weapons platoon their annual proficiency test. The platoon, consisting of a 3-inch Stokes mortar section and a 37mm gun section, was part of the regimental headquarters company and was usually staffed by personnel with multitudinous duties, which allowed them scant time for training. The test—which involved the occupation of firing positions, the execution of defensive fires, forward displacement, and the execution of fires on targets of opportunity—was a difficult one, and I did not expect noteworthy results. My expectations were further reduced when the platoon leader reported to me for instructions. He was a slightly built, grey-haired, soft-spoken master sergeant who looked more like a paper pusher than a field soldier.

Was I ever surprised! The only criticism I could make was the failure of a mortar crewman to don heat-protective gloves before evacuating a misfired round from the tube. Aside from gaining a healthy respect for those 8th Infantry "regulars," I also was reminded of a maxim (honored more in the breach than in the observance) that one should never pre-judge performance by initial offhand impressions.

Colonel Hillman's discourse on the mini-railroad also jogged my memory. No one who ever served at Fort Benning in those years will ever forget it. After

a full day in the field, the train ride back to the post was a real morale builder. There were several uphill stretches where, as the train slowed down, everyone would pile off and run alongside until the locomotive was over the hump, then pile back on amidst cheers as the engineer tooted his thanks.

The train also affected me in a different way. In 1933, I was detailed to assist in the investigation of a very large discrepancy—amounting to several hundred thousand dollars, as I recall—in the account of the post quartermaster. The process was quite tedious.

First, an office check was made of all receipts and disbursements for a particular item for the previous year. The resulting tally was then checked in the warehouse. After checking hundreds of items, we could find nothing wrong. If the office record showed 63 shovels on hand, that was exactly what we found in the bin. On one occasion, the tally showed 10,001 blankets, but my warehouse check showed only 10,000, all in bales. Elated that at last I had found a discrepancy, I confronted the warehouseman—a grizzled, elderly QM sergeant—with my find. But my elation was short lived. With that slightly sardonic, paternal look reserved by senior sergeants for uppity young second lieutenants, he produced from a locker a single blanket clearly marked "Inspected and Condemned."

Finally, much to everyone's relief, one enterprising cohort found that a branch of the Chattachoochee Choo Choo had been abandoned, but the value of the rails had never been dropped from the inventory.

And this evokes another maxim: If you've got a big problem, look first for a big solution.

DAVID W. GRAY
MG, U.S. Army Retired
Golden Beach, Florida

MISLED

I read with interest the March-April 1989 issue of INFANTRY, especially the article "The Seig River Incident," by Major Thomas H. Jones (pages 29-33).

As I scanned the article, noticing the pictures of the patrols from World War II and reading the editor's introductory comments—specifically, "most important was the patrol leader's apparent inability or unwillingness to make sound and timely decisions"—I expected an article about tactics, such as those in Ranger School.

Imagine my surprise when I read the article about a young man's refusal to kill a prisoner. Therefore, the introduction was even more troubling. What would you suggest as a "sound and timely decision"?

Perhaps, instead of implying that the young man's decision was unsound, you might have highlighted in your comments the importance and consequences of the values we hold. We condemned the Germans for their brutality during the war, and certainly this young private first class made a high-risk choice on the basis of ingrained boyhood training. He couldn't know the answers to many of the ethical dilemmas posed by Major Jones, but he did know one thing: To kill a prisoner under those circumstances was wrong. He could have gone to jail, or worse.

As it turned out, the German soldier was found where the Americans had left him, and they, in turn, were taken prisoner. We know they lost their freedom. We don't know from the article whether they died in captivity. Quite a choice for a kid to make!

You might have brought that out.

WILLIAM M. SHAW II
MAJ, Military Intelligence
Fort Devens, Massachusetts

AUTHOR'S DEFENSE

When I wrote the article "Map Course Distances" (INFANTRY, July-August 1989, pages 12-15), I was concerned that the technical nature of the article would put readers off. I worked hard to make it as light and easy to read as possible, given the nature of the material. Apparently, judging from the comments of Lieutenant Patrick J. Conlon (November-December 1989, page 3) and Major Russell A. Gallagher (January-February 1990, page 4), I failed in that mission.

Unfortunately, it appears that most of their criticism was directed at what they *thought* I wrote rather than what I actually wrote.

- At no point in the article did I suggest that this method be taught to junior soldiers. On the contrary, teaching them this method would be worse than useless; it would only confuse and frighten them, and we have enough of that already.
- The method is for use when *exact* and *precise* distances must be determined, and that is made clear throughout the article. Obviously, there is no need for this kind of accuracy if a unit is navigating from one terrain feature to another. But if absolute precision is required, I believe the method I described fulfills that requirement better than any other.
- Both the lieutenant and the major suggested the "simpler" method of using a piece of paper and the scales on the map to determine distance. This method is indeed simpler. I learned it first in basic and advanced individual training and have used it many times over the intervening 22 years—and still do for "quick and dirty" solutions. But it is *not* more accurate, as the lieutenant suggests. There are at least six possible errors using this method. Additionally, a standard Government-issue .5mm mechanical lead pencil has a built-in error of 25 meters for each point it marks on a 1:50,000 map, or at least 50 meters for two points. Good enough for "quick and dirty" but not nearly good enough for setting up a map course.

A key factor in teaching land navigation is developing the students' confidence in themselves and their equipment. To do that, you start small, giving them some easy successes. Then you build on these successes by going to more and more difficult land navigation problems until they find themselves navigating successfully over longer distances and more difficult terrain, almost without realizing how much their skill has progressed.

In the early stages, poor instruction, antiquated equipment, and poor courses can destroy that budding self-confidence in a new student. (Try to remember the first time you were on a compass course.

After carefully counting each of your footsteps and trying to stay precisely on the ½-degree of the required azimuth, you looked up from your compass and saw nothing but trees, and they all looked exactly alike. Did you feel the stirrings of panic, uncertainty, self-doubt because you couldn't see the marker? Or did you feel elation—"I did it! This isn't so tough!"—when you came out close to the marker? If so, try to identify with that new map reading student.)

The intent of the article was not to replace existing methods but to supplement them—to assist those who *lay out the course* (not those going through it) in determining the *exact* distance between points, thus reducing one more factor that can destroy a new student's self-confidence.

I think there is a lot wrong with the way we teach land navigation in our service schools. For one thing, we teach people they must pass our land navigation courses. For this, they learn, contrary to Lieutenant Conlon's assertion and common sense, that they usually must navigate to within five feet of a fencepost or marker (usually hidden, it seems, in the middle of a bush) and then find it. If they don't find enough markers, they flunk the course. Yet in the real world, as both Lieutenant Conlon and Major Gallagher imply, we don't navigate that accurately; we navigate to terrain features.

I have survived the school environment many times, and I have also competed in orienteering on an international level and navigated in the field under a variety of unpleasant circumstances. And, as we all have, I have spent time looking for markers that were not where I knew they should be.

I have also developed map courses and methods for students, trying to incorporate some of what I have learned the hard way. The article was one attempt to share some of that knowledge. Others who read the article and try the method will have to judge my success or failure.

CHARLES F. COFFIN
MAJ, Special Forces
Triangle, Virginia

SOMETHING MISSING

Having spent 20 years in Special Forces, airborne infantry, and long range surveillance units, I read with only passing interest the Commandant's Note on the new Bradley platoon organization in the January-February 1990 issue of INFANTRY (pages 1-2).

I was favorably impressed, however, with the efforts to adapt the structure and tactics of small mechanized infantry units to more effectively complement their principal fighting system, the M2 Bradley. The rifle platoon's manpower has been restructured to provide both for the local security of the vehicle and for a dismounted force that is capable of applying effective fire and maneuver.

The new structure also offers dedicated vehicle commanders, who are most able to employ the vehicles' substantial firepower. The whole concept indicates a pleasing ability to embrace a different organizational concept, something we have not always been able to do in the past.

But something did seem to be missing. I began to recall a popular science fiction movie, *Aliens* (please bear with me). The lieutenant commanding a platoon of "Colonial Marines" attempted to control (not command or lead) his platoon by audio-video link from the security of the unit's armored ground transporter (an APC of sorts). The platoon's two teams (squads) would dismount to do the grunt work while he shouted instructions over their helmet-mounted radios. Much to the ultimate sorrow of the dismount element, this did not prove to be an effective command, control, and communication system.

Although Hollywood has never demonstrated much in the way of tactical proficiency, the scriptwriter did have one point right. The dismount element had a single leader, the platoon sergeant, on the ground to directly control the two squads.

It appears to me that this is what is lacking in the new Bradley platoon organization. Who commands the two dismounted squads? The platoon leader is more than occupied with fighting his own vehicle—watching his wing vehicle, navigating, searching for targets, and directing the B section—to control two dismounted squads effectively. Additionally, the squads will not always be within sight of the Bradleys, especially in urban or wooded terrain, or even in dense brush.

The organization ignores the principle of unity of command. There needs to be a single leader on the ground to command the two fire and maneuver elements, and he should not be one of the squad leaders. They will have their hands more than full.

GORDON L. ROTTMAN
SFC, U.S. Army Reserve
Houston, Texas

WORLD WAR I ENCYCLOPEDIA

The Garland Publishing Company is looking for essays of 500 to 5,000 words on various aspects of infantry actions, weapons, equipment, and personnel during World War I to be included in a volume of *Encyclopedia of American Wars.*

Anyone who wishes to contribute is invited to write to me at 14509 Triple Crown Place, Darnestown, MD 20878.

DR. ANNE C. VENZON

MILITARY HISTORY SYMPOSIUM

The Department of History at the U.S. Air Force Academy will sponsor the Fourteenth Military History Symposium 17-19 October 1990. The theme is "Vietnam, 1964-1973: An American Dilemma."

For more information, anyone who is interested may write me at Department of History, U.S. Air Force Academy, USAF Academy, CO 80840-5701, or call me at AUTOVON 259-3230, commercial (719) 472-3230.

SCOTT W. ELDER
Captain, U.S. Air Force

INFANTRY NEWS

THE 1990 INSTRUCTIONAL Material Catalog has been published and is available from the U.S. Army Infantry School. The catalog contains a complete listing of all the instructional materials available from the School, including special texts, programmed texts, pamphlets, maps, and reference cards.

Each listed publication has been screened and carefully selected for information content, teaching value, and adaptability to individual unit training requirements. All of these publications are continually updated and revised in close coordination with the School's resident instructional departments.

The catalog is available from Commandant, U.S. Army Infantry School, ATTN: ATSH-TDW, Fort Benning, GA 31905-5593.

THE U.S. ARMY MARKSMANSHIP Unit (USAMU) at Fort Benning is looking for qualified pistol shooters for the United States Army Service Pistol Team. Soldiers in any rank or military occupational specialty may apply so long as they have a strong background in pistol competition.

Applicants should include copies of their DA Forms 2-1, DA Forms 2A or officer record briefs, along with a short resume containing background and shooting experience. Shooters who have succeeded in competition are strongly encouraged to apply.

Although soldiers may apply at any time, they must complete their current tours before being assigned to USAMU.

Applications or requests for further information should be sent to U.S. Army Marksmanship Unit, ATTN: AFYC (S-1), P.O. Box 55810, Fort Benning, GA 31905-5810.

THE HOTLINE NUMBER at the U.S. Army Natick Research, Development, and Engineering Center has been changed. The new number is AUTOVON 256-5341 or commercial (508) 651-5341.

Soldiers may call this number to comment on any item developed by Natick.

THE U.S. ARMY SPECIAL Operations Command (USASOC) was established 1 December 1989 at Fort Bragg. The new command will oversee Active Army and Reserve Component special operations forces that previously reported to several different commands.

USASOC will report directly to the Department of the Army.

REFERENCE THE NEWS ITEM on the MK 19 grenade machinegun (INFANTRY, March-April 1990, page 5), the initial fielding plan for the MK 19 is as follows: The first 645 guns were fielded to the 9th Infantry Division at Fort Lewis in November 1989. The remaining scheduled weapons will be fielded to schools of the U.S. Army Training and Doctrine Command (TRADOC), to Military Police units, and to light infantry divisions.

THE INFANTRY OCS ALUMNI Association recently presented its first two Jess Walls Distinguished Officer Candidate Awards. The first was awarded to Second Lieutenant Edward Howell at the graduation of OC Class 1-90 on 25 January 1990 and the second to Second Lieutenant Carl Nasatka of OC Class 2-90 on 1 March 1990.

The award consists of an Army saber, symbolic of a leadership position in an Officer Candidate class, and an engraving on an accompanying plaque or the saber's scabbard depicting the name of the award, the recipient, and the donor, and its presentation in honor of Colonel Walls. The award also includes a complimentary life membership in the association.

Colonel Jess W. Walls, for whom the award was named, graduated from OC Class 1 on 27 September 1941. Colonel Walls, who retired in 1966, was instrumental in organizing The Infantry Officer Candidate School Alumni Association and was its first treasurer. He died on 25 November 1989.

An officer is selected to receive the award by the same Board of Judges appointed to select the Distinquished Honor Graduate and the Leadership Honor Graduate of each class. The judges select the one graduate from each class who, in their judgment, has best distinguished himself or herself by an act of intrepidity or outstanding leadership or initiative, or by sustained superior performance or effort during all or part of the course. The award is presented along with the other awards at the class's graduation ceremony.

Regular membership in the Association is open to graduates of the OCS at Fort Benning, Georgia, or Fort Riley Kansas, regardless of branch. Associate membership is open to graduates of other OCS programs and to other persons who have made and will continue to make significant contributions to the program. Annual dues are $10.

Anyone who is interested in joining may write to Secretary, The Infantry OCS Alumni Association, P.O. Box 2192, Fort Benning, GA 31905.

A BREAD THAT STAYS FRESH for three years has been produced by the Army Natick Research, Development,

and Engineering Center. The recipe requires no sugar or eggs but includes sucrose ester emulsifier, an ingredient that controls spoilage.

The bread will be available as a supplement to the MRE (meal, ready to eat).

A BIBLIOGRAPHY OF STUDIES titled "Rear Area Security" is available to authorized persons from the U.S. Army Logistics Management College (ALMC).

Anyone who would like a copy should write to ALMC, ATTN: AMXMC-D, Fort Lee, VA 23801-6043; or call AUTOVON 687-4655 or commercial (804) 734-4655.

A LIGHT 30-DAY RATION has been developed at the Army Natick Research, Development, and Engineering Center. The new ration, which weighs less than one pound and measures less than 45 cubic inches, should be available to special operations soldiers within the next two years.

It consists of eight dehydrated bars including entree, bread, cereal, dessert, dairy, cocoa, fruit beverage, and beef jerky. It is packaged to provide six-day menu cycles with 2,100 calories each day.

THE FRENCH ARMY has approved a new 40-man standard mechanized infantry platoon.

Currently, there are two types of platoon—a 42-man motorized platoon equipped with four VABs (front-armored cars) and a 33-man mechanized platoon equipped with three AMX-10Ps (tracked infantry vehicles).

The new structure will have four VABs or AMX-10Ps, with a headquarters section, three rifle squads, and an antitank squad, a total of 40 soldiers. During dismounted operations, the drivers and radio-telephone operator/gunners will remain with their vehicles.

Each infantry squad will be equipped with the LRAC 89mm recoilless rifle and the antitank squad with the APILAS 112mm light antitank rocket. Starting in 1992, the APILAS will be replaced by the 600-meter range wire-guided ERYX. The only machineguns in the platoon will be the 12.7mm Mi mounted on the VAB and the 7.62mm coax on the AMX-10P.

The new structure will be tested in three battalions (including the one in the new Franco-German Brigade) during late 1990. Although changing over to the new structure could begin during 1991, it will take several years to complete.

THE SOLDIER MODERNIZATION Plan is a strategy for increasing management and funding support for outfitting the individual soldier. Part of this strategy is to treat individual clothing and equipment items as a total package (known as the soldier support system) rather than as separate items.

The soldier support system includes all items worn, carried, or consumed by the soldier in the field. It includes items such as protective clothing and masks, individual weapons, individual communication equipment, optical devices, eye and ear protection, operational rations, parachutes, load-carrying equipment, hand-carried missiles, and ancillary equipment. These items are considered essential to survival, sustainment, and combat effectiveness on the battlefield.

THE PERSONAL COMPUTER Query Tool (PCQT) is a software package that contains scientific and technical intelligence data on foreign army nonmissile systems that may threaten U.S. forces. It was developed by the Army Foreign Science and Technology Center from classified Army Intelligence Agency data and released in September 1989.

The IBM-compatible PCQT allows a user to view an individual weapon system, compare weapon systems side by side, produce spreadsheets of parametric data, and viewgraphs and comments related to a weapon. It allows spreadsheets to be built and saved for later reuse, merged to produce custom spreadsheets, or saved in the standard flat-file format (American Standard Code for Information Interchange, or ASCII) to permit loading into word processing or other software.

The package is easy to install, includes "help" menus and screen documents, and can be operated using either a keyboard or a mouse. System requirements include Zenith-248 with Intel 80286 microprocessor (or equivalent DOS-based system), one high-density floppy disk drive, at least 20 available megabytes of disk space, and a color monitor with EGA or VGA graphics card.

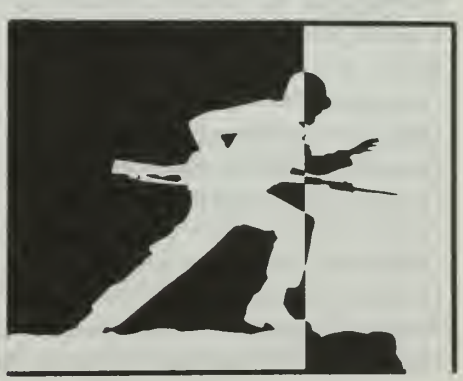
Subsequent versions will include data from the Army Missile and Space Intelligence Center, the Air Force, and the Navy.

Further information is available from the U.S. Army Foreign Science and Technology Center, ATTN: Plans and Operations, 220 Seventh Street NE, Charlottesville, VA 22901-5396.

A CAPTURED FUELS KIT has been developed by The Army's Belvoir Research, Development and Engineering Center. The kit will enable units to quickly check captured or commandeered mogas and diesel fuels for density, viscosity, and contamination. If the fuels are found to be compatible and uncontaminated, they can be used in ground vehicles and equipment.

The test kit, which measures 3½ inches by 4 inches and weighs less than ½ pound, is designed for use in emergencies only. (In most combat areas, a petroleum laboratory would test fuels for quality.)

The fielding of the first of 1,500 contractor-produced kits began in November 1989.



PROFESSIONAL FORUM

LADP
Leadership Assessment and Development Program

MAJOR HARRY CHRISTIANSEN

Our infantry leaders are entrusted with the Army's most precious resource—our soldiers. We therefore have a moral obligation to see that those soldiers get the best leaders possible.

Toward that end, the Training and Doctrine Command (TRADOC) directed in 1988 that formal leadership assessment be integrated into all resident leader development courses at the various service schools, using the U.S. Army Cadet Command's Leadership Assessment Program as a model. The Center for Army Leadership (CAL) at Fort Leavenworth was designated the executive agent to coordinate the assessment programs within TRADOC.

The Infantry School began using leadership assessment in the Infantry Officer Basic Course (IOBC) in September 1988 and in the Infantry Officer Advanced Course (IOAC) in January 1989. Within a few months, however, CAL recognized that the program was not being consistently executed throughout the service school system. Subsequently, the center developed the Leadership Assessment and Development Program (LADP) to standardize the assessment procedures and the criteria for integrating LADP into the individual courses of instruction. Within this guidance, each service school is developing its respective assessment programs. At Fort Benning, the advanced and basic officer courses and the Advanced Noncommissioned Officer Course (ANCOC) are scheduled to implement LADP this fiscal year.

The LADP is a structured process that focuses on developing a student-leader by giving him immediate feedback on his performance in certain selected events throughout the course; by counseling him on his strengths and weaknesses; and by preparing a plan he can use to improve his future leadership performance.

POSITIVE EXPERIENCE

The program is designed to be a positive and useful experience, not one that intimidates a student or otherwise affects him in a negative way. Thus, the information obtained through the LADP process is not used for assigning grades or academic points, or for rank ordering the students. Neither are the results of an assessment tied to a student's Service School Academic Evaluation Report. In fact, it is left to the individual student to decide whether he wants to use the feedback to improve his leadership performance. If a student believes he has a moral obligation to give soldiers his best possible leadership, his decision should be an easy one.

The doctrinal basis for the program is FM 22-100, Military Leadership, and the manual's nine "leadership competencies" provide the framework for all of the assessments. These are communications, supervision, teaching and counseling, soldier team development, technical and tactical proficiency, decision making, planning, use of available systems, and professional ethics. They establish broad categories of skills, knowledge, and attitudes that define the leadership areas in which infantry leaders must be competent.

Three techniques are used in LADP to give each student different views of his leadership performance—self assessment, associate assessment, and instructor or cadre assessment.

Self assessments help a student identify those leadership competencies upon which he needs to focus his self-development efforts. The Leadership Assessment Form (Self) consists of 36 leadership performance indicators (four for each competency) on which the student rates himself on a scale of one to five.

Associate assessments give each student information on how other students perceive him. This information helps him identify the areas in which he needs to improve. The Leadership Assessment Form (Other) used for this purpose consists of the same leadership performance indicators and rating scale that is found on the self assessment form. Along with each associate assessment, each student must also complete a self assessment. This allows him to compare the way he sees himself at that point with the way others see him.

Instructor or cadre assessments are conducted by trained assessors to give each student multiple, independent assessments of his leadership performance. These assessments are based upon selected training events in which a student demonstrates leadership while performing a task. The length of an assessment can be less than 10 minutes (Leader Reaction Course) or as much as 24 hours (a platoon leader on a field training exercise). An assessor must be knowledgeable of the task a student is performing and must be able to give him feedback on his performance as a leader.

Assessors (instructors or cadre members) observe the behavior of a student-leader, record it, classify it into competency areas, rate the student's performance in each area, and provide feedback in the form of an after action review. Senior assessors (small group instructors or platoon trainers) consolidate and integrate the assessment data, then counsel each student and help him create a leader development action plan of his own.

A student's leader development action plan, which is based upon all the assessment information collected during the course, represents actions he can take to improve his leadership ability. Each student is expected to take this plan with him to his follow-on assignment and use it to become a better leader. There is no requirement for the commander of his new unit to do anything with the plan.

MASTER ASSESSORS

The Center for Army Leadership trains and certifies Master Assessors to design assessment programs, train other assessors, and administer and evaluate the program. Only Master Assessors can perform these functions, because they are trained to ensure that there will be high quality in a program's development, implementation, and evaluation.

In the Infantry School, the Combined Arms and Tactics Department administers and evaluates the LADP. Each leader training course (IOBC, IOAC, and ANCOC) has a Master Assessor to design and implement its specific program.

The Directorate of Training and Doctrine also has a Master Assessor to conduct assessor training for all the courses, while the Directorate of Evaluation and Standardization evaluates the effectiveness of the program and provides the results to the program administrator for action.

The Infantry School's Officer Candidate School (OCS) and Ranger Course are excluded from the program because of the nature of their missions. Since the OCS mission is similar to that of the Cadet Command, the OCS leadership assessment program is designed along the lines of the Cadet Command's program. In the Ranger Course, leader performance is already tied directly to graduation requirements.

The Infantry School's leader training courses provide an environment in which the student's leadership skills can be properly assessed and in which they can be helped to grow professionally. The Army's infantrymen deserve the best leaders they can get, and the Leadership Assessment and Development Program helps the School provide those leaders.

Major Harry Christiansen is a leadership instructor in the Infantry School and the LADP Manager.

Developing Lieutenants

CAPTAIN CRAIG J. CURREY

As you prepare to take command of your infantry company, one of your key tasks will be to develop your lieutenants. You may have had only limited experience in leading officers and limited training in techniques aimed specifically at developing lieutenants. But building a strong base of platoon leaders in your company will eliminate a number of problems and create a more cohesive unit.

The following tips are presented to stimulate thought on how you might approach the job of professionally building new officers. These tips concentrate on day to day activities apart from a formal officer professional development program. They may at least cause you to think about something you may have overlooked.

The first is to consider your attitude toward your officers and the tone of your relationship with them. Remember the techniques you liked when you were

a platoon leader and use them on yours. Your lieutenants will be eager to prove themselves, so give them the opportunity to do so. Do not micro-manage them but give them the leeway to execute a mission and only minimum guidance to make sure it meets your intent.

Keep your door open so they can always approach you with problems, offer criticism, or seek your advice. Although this tone is hard to achieve, it will become the most important element in developing the lieutenants.

Be confident in your actions but not inflexible and arrogant in your attitude, because you will make some mistakes. Work with your lieutenants for team cohesiveness. Give credit to them when credit is due. Do not blame individual platoon leaders for company failures; you are ultimately responsible. Finally, reward the lieutenants as you would any other soldier. A kind word or a medal can go a long way in bolstering their confidence and the desire to excel.

Once you have established two-way communication with the platoon leaders, seek their input on training and company matters. Demand input on the training schedule and feedback from past training. Value that input and apply it to future training where it is appropriate. Furthermore, using a platoon leader's suggestion will build his confidence while it helps the unit.

Do not be afraid to cross-check personnel decisions on awards, job changes, promotions, and schools that have been recommended by the noncommissioned officer support channel. Your queries will force a lieutenant to stay abreast of decisions in the company that affect his platoon and will also broaden his view of a company commander's balancing act. Cross-checking also helps prevent mistakes from being made in the recommendations.

You must also counsel your lieutenants regularly in writing. In addition to fulfilling officer evaluation report (OER) requirements, say everything that is on your mind, and use the sessions to fine tune the company's officers. Comment on any problem area you may find while bringing out the many good things an officer is doing. Say the things that will not be covered in the OER. Comment on all aspects of performance, including off-duty conduct. Pulling your punches at this stage may only lead to larger, more serious problems later.

Your reaction to a lieutenant's mistakes is critical. When you find yourself saying some of the traditional lines such as "I can't believe you were that stupid," or "You did *what* in front of the battalion commander?" stop for a moment and give the officer specific constructive guidance. Make sure he knows exactly what went wrong and how to do it properly next time.

Temperamental outbursts are not a substitute for constructive guidance. Remember, if you have not told them or taught them something, you cannot expect them to know more than the basics.

Support honest mistakes that are made aggressively. If your lieutenants are developing well, they will not repeat errors but will learn from them. Push your executive officer and platoon sergeants to teach the lieutenants before they make even their first mistakes. Competence and confidence will grow out of leaders who aggressively seek every training opportunity and who do not fear retribution.

In teaching tactics, try a tactical exercise without troops (TEWT) with the platoon leaders and platoon sergeants. After your company operations order, allow each of the platoon leaders to plan his actions with his platoon sergeant. Go to the various platoons and discuss each plan with the lieutenant. These discussions will ensure that the platoon leaders have solid tactical techniques before they lead their platoons on a field training exercise, and will also ensure that they know your standards.

If you are new in the company, the TEWT can become a chance to verify company standing operating procedures and check each platoon leader's tactical ability. Also use your previous experience to teach them about forces and techniques that they may not see in your present unit. For example, if yours is a light infantry company and you have had mechanized infantry experience, include a mechanized company position in the TEWT. Teach the platoon leaders techniques that you may not have time to execute within your company, such as a tire house, a quick-kill range, or pathfinder operations.

Adopt a liberal policy of schooling for your platoon leaders. Although it is difficult to have key leaders absent, plan a rotation or periods in which they can attend schools. Support off-post schools such as the Ranger Course or the Infantry Mortar Platoon Course for them. Build for their professional future so they will be competitive for future jobs in the battalion.

Make use of any on-post schools to prepare a platoon leader for future executive officer positions. Such schools will provide the added benefit of giving

you more knowledgeable platoon leaders who can better train their platoons and fill in for the executive officer when necessary.

In addition, begin to train your lieutenants for some company command functions. When discussing certain policy or training issues, begin with the phrase "When you are a company commander." As the platoon leaders become more experienced, force them to look beyond their platoons and see the company as a whole. Explain to them the process for your change of command inventory, for example, and your monthly ten percent inventories. Let them see what they will be doing so that the officer advanced course will not be their first exposure to company level supply accountability.

Finally, support your lieutenants as they prepare to leave the company by caring for them and fighting for their next duty positions. Make sure you know the exact jobs they want and discuss a realistic priority of duty positions with them. Do everything you can to ensure that the battalion commander gives every consideration to your lieutenants in filling duty positions.

As a platoon leader leaves the company, present him with a company memento such as a plaque at a company formation. Give him the recognition he has earned, and take satisfaction that you have started him on a career of professional development.

Captain Craig J. Currey commanded a company in the 2d Battalion, 60th Infantry, and served as an assistant S-3 for training in the 2d Battalion, 75th Ranger Regiment, at Fort Lewis. He is a 1982 graduate of the United States Military Academy and is now pursuing a graduate degree at the University of North Carolina, Chapel Hill.

Class III Operations

CAPTAIN FREDERICK J. GELLERT

When German General Erwin Rommel's Africa Corps began an offensive campaign in April 1941, his intent was to race across North Africa, defeating the enemy and capturing key ports en route to use in resupplying his forces. One of these, Tobruk, was particularly significant, because it was large and had fixed facilities for unloading vast amounts of supplies. Unfortunately, he found the British Army a stubborn and tough enemy who attacked his resupply convoys as they traveled across the desert from Tripoli. More significant was the deteriorating maintenance level of his supply vehicles.

Although he made it to Sollum, Egypt, he had added more than 700 miles to his supply lines. At the deepest point, 30 percent of the fuel intended for his tanks was being used by the vehicles transporting it.

By December, with its supplies exhausted, the Africa Corps was in full retreat and had abandoned hundreds of vehicles and tons of supplies. Rommel's brilliant tactical successes had been defeated by his logistical failures.

Just as Rommel's army needed vast logistical support to succeed in the 1940's, so, too, does ours in the 1990s. As the U.S. Army today acquires increasingly heavier and more modern equipment, its logistical needs increase substantially. Even its light divisions require considerable logistical support to accomplish their missions.

This article considers only one aspect of that logistical support: Class III supply operations. It discusses planning considerations and the assets available to support Class III requirements as they apply to the current mechanized infantry battalion equipped with Bradley fighting vehicles.

The expected fuel consumption for this battalion's combat vehicles is high (as shown in Table 1), and factors such as cold weather and adverse driving condi-

DAILY FUEL CONSUMPTION

EQUIPMENT	CONS RATE (Gal/Day)	# IN BN	TOTAL (Gal/Day)
M3 Bradley CFV	165	6	990
M2 Bradley (IFV)	165	54	8,910
M106 Mortar Carrier	80	6	480
M577 Command Post	79	8	632
M113 APC	99	27	2,673
M901 ITV	99	12	1,188
M1 Tank	645	14	9,030

Figures are based on European factors as found in FM 101-10-1, Volume 2, dated October 1987.

Table 1

tions can increase consumption dramatically. (The table includes figures for the M1 tank, because tank companies, although not organic to an infantry battalion, are generally cross attached.)

The amounts shown are for combat vehicles only; they do not include fuel for wheeled vehicles, heating and generating equipment, and other fuel-burning equipment, all of which add significantly to a battalion's Class III needs.

(As an example, during a 16-day training exercise at Hohenfels, West Germany, in November 1987, a task force of two Bradley and two M1 tank companies used 75,500 gallons of diesel fuel.)

The organic fuel carriers and the other assets that a battalion has available to transport this fuel to the maneuver units are shown in Table 2. (In some modified tables of organization and equipment, these figures may vary).

As the table shows, a mechanized infantry battalion normally has seven tank and pump units (TPUs) mounted on five-ton truck beds and seven tank pods mounted on one-and-one-half-ton trailers. In addition, a mechanized infantry task force can expect to get two HEMTT (heavy expanded mobility tactical truck) fuelers from the armor battalion for each tank company attached to it.

The M969 trailers that belong to the forward support battalion are used to resupply the maneuver units' TPUs and HEMTTs. The forward area refuel equipment (FARE) or fuel system supply points (FSSPs), or both, can be set up to refuel the maneuver unit's fuel carriers directly.

All of this equipment may seem to offer a lot of fuel capacity, but some quick mathematics demonstrates a shortfall in a unit's organic fuel assets:

A Bradley battalion's seven TPUs have a capacity of 1,200 gallons each and its seven tank units, 600 gallons each—a total capacity of 12,600 gallons. But the battalion's expected daily consumption rate (for combat vehicles only, as depicted in Table 1) is 14,873 gallons (not counting the M1 tanks), which leaves a shortage of more than 2,000 gallons per day.

No level of command—from company to theater army—has enough organic fuel assets to sustain itself for very long. Class III resupply must therefore be a continuous operation. Unlike food, ammunition, and spare parts, fuel cannot be pre-stocked somewhere by forward units to be used as needed. It requires containers and dispensing equipment. In short, fuel resupply is a significant logistical problem for both the tactician and the logistician.

In addition to fuel, Class III resupply also includes package products—oils, greases, and other fluids that keep machinery running—and a unit must plan for these as well. Obviously, an engine that runs out of oil will stop running just as fast as one that runs out of gas, and it will suffer a lot more damage in the process.

Package products, because of their bulk and weight, present a bigger problem in some ways than fuels. A supply of 1,200 gallons of fuel, for example, sits on one truck bed in two pods and can be dispensed by pump in about 24 minutes. But 1,200 gallons of oil in 55-gallon drums takes up at least two truck beds and takes hours to unload and to dispense by hand pump.

Package products require a great deal of labor (one 55-gallon drum weighs over 400 pounds) and also a great deal of space. A logistician often must decide how many other supplies can be left behind so that his available cargo space can be used for package products. Additionally, commanders and supply personnel must request package products well in advance to allow time for procuring, loading, transporting, unloading, and dispensing them.

In my battalion, we found that the easiest way to deal with package products was through standing operating procedures (SOPs) that covered who carried which oils or greases and in what quantities. These procedures were tempered by experience and the type and length of the operation in which the battalion was participating.

The support platoon dedicated one or two trucks to hauling the battalion's basic load, and each fuel truck carried an assortment of products each time it went forward to refuel. The quantity carried could be increased or decreased as a company requested ahead of time. All of the maintenance vehicles carried five-gallon cans of oils and greases, and the maintenance collection point was given 55-gallon drums of oil. Finally, each vehicle carried two quarts of the oil it needed to operate. In this way each echelon in the battalion could support itself for a time before it had to be resupplied with package products.

One word of caution, though. While this system worked well in peacetime, if that same battalion had to go to war with all its basic loads and equipment, it would find a significant shortage of space. The battalion would have to consider carefully which oils and how much of each kind it would carry.

The task of actually supplying the battalion with Class III products falls to the

FUEL ASSETS

EQUIPMENT	CAPACITY (GALLONS)	PUMP (GPM)	NUMBER	WHERE
Tank & Pump Unit	1,200	50	7	In Bn
Tank, Fuel	600	None	7	In Bn
M978 HEMTT	2,500	300	12	Ar Bn
M969 Trailer	5,000	350	10	FSB
M969 Trailer	5,000	350	30	Div
FARE*	1,000	100		Div
FSSP*	6,000	2 x 350		Div

*FARE (forward area refuel equipment) is an airmobile system using 500-gallon blivets; usually found in Aviation units but can also supply ground forces. FSSP (fuel system supply point) is a large system of pipes, pumps, and 10,000-gallon collapsible bags used to resupply bulk transporters.

Table 2

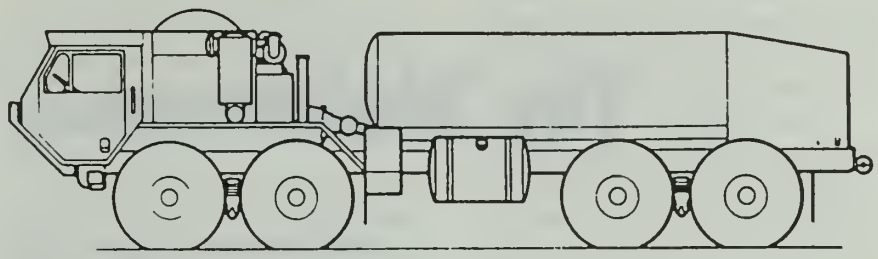
POL (petroleum, oils, and lubricants) section of the battalion's support platoon, which also has two other sections—ammunition and transportation. (Although the mess section also usually falls under the support platoon, it is actually a separate section under the headquarters and headquarters company. The platoon reports to the S-4 and receives its missions from him, but all of its administrative and maintenance support comes from the HHC.)

The POL section has one noncommissioned officer and seven driver/operators (MOS 77F). This means that each fuel truck has only one driver, as do the other support platoon vehicles. These eight soldiers must receive, dispense, and account for all the battalion's fuel and package products.

This is a significant task for such a small section, especially during sustained tactical operations. Generally, in my unit, I pulled drivers from the other sections to help the POL section but here again, this would be difficult to do in actual combat because the other sections would be just as busy. It is a real challenge for the support platoon leader to plan his platoon's work and still allow his soldiers to function over long periods.

To get fuel to the users, a battalion must first adhere to the principle that Class III products are not demand-supported—they must be pushed forward constantly to the units. Certainly, the flow of reports helps logisticians plan the unit's needs, but even in the absence of formal requests, the fuel must still arrive as planned. Although Class III resupply accelerates or decelerates as the situation develops, it never stops.

Nevertheless, Class III resupply uses the same techniques as the other classes of supply. Generally, a logistical package (LOGPAC) that has food, fuel, ammunition, and parts on support platoon trucks is sent forward to a unit. One TPU with a trailer pod is sent forward for each Bradley company and two HEMTT fuelers for each tank company. The trucks are driven to a logistics release point, where they are turned over to a company for a set period. Then the trucks move back to pick up more supplies and start the process over again. Empty



trucks must always be moving to get more fuel for themselves or their units.

As a company receives its supplies, they are quickly moved to a secure area and unloaded. Package products are unloaded and distributed as necessary.

Generally, the fuel trucks are set up and a company's vehicles come to them in what is known as the "service station" technique. This is usually done when the fuel truck cannot go where the tracked vehicles have gone. This technique is the fastest because a fuel truck can remain set up with its pump running as vehicles move through the refuel point.

As an alternative, the "tailgate" technique, in which the fuel truck goes to each separate vehicle, can be used. This method is less preferred because it is slower and can compromise each vehicle's position. It does have one advantage over the service station technique, though, in that the fuel point itself does not become a stationary target.

Throughout this process, the company commander must assume an integral role in making sure the resupply operation is conducted quickly and efficiently. If a piece of equipment fails to receive fuel, it is the commander who is responsible, not the fuel truck operator. Speed is critical because the trucks must return to refuel in the brigade support area. Efficient and quick refueling marks a good unit.

In dealing with Class III, then, a unit will succeed if it keeps the following points in mind:

- Unit SOPs must include what is to be carried and how the refuel operations are to be conducted. Then the unit must constantly train for and practice refueling techniques and procedures with critiques at the end of the training.
- Class III planning must be done concurrently with the tactical planning, not after. Resupply is based on the situation; for example, offensive operations require more fuel than defensive operations. If the logisticians are part of the planning process, they can more accurately assess the requirements and provide guidance on requirements and restrictions.
- Class III operations must be continuous. No matter what the situation may be, fuel is used and must be resupplied. Fuel consumption increases or decreases, it never stops.
- Vehicles must stay "topped off." Any time fuel arrives in a unit, all its vehicles must refill, because there is not telling when it will get fuel again. The fuel carriers themselves must also stay full, especially in units that are deployed forward and units that are prepared to deploy on short notice.
- Leaders must be actively involved in resupplying their units. They cannot rely solely on a staff person to accomplish this mission. A unit that is not logistically supported will fail just as quickly as one that fails tactically.

Class III operations are critical in today's Army, because so much depends upon petroleum for battlefield operation and success. Petroleum is a precious commodity that requires detailed planning and conservative use. Only with good training, skilled logisticians, and determined leaders can units successfully accomplish their missions in relation to Class III operations.

Captain Frederick J. Gellert served as a Bradley platoon leader, a support platoon leader, and a company executive officer in the 3d Infantry Division in Europe. He is now assigned to the 1st Battalion, 327th Infantry, 101st Airborne Division (Air Assault). He is a 1985 ROTC graduate of the University of Detroit.

The Maintenance Battle

CAPTAIN MARK A. MEADERS
CAPTAIN RICK BAILLERGEON

Good commanders realize that, with today's complex combat systems, good maintenance is an important combat multiplier and poor maintenance can often spell defeat for their units.

Although published doctrine gives current battalion maintenance officers (BMOs) a place to start in conducting maintenance operations, it does not offer a "nuts and bolts" approach to the complex maintenance problems of a high intensity battlefield. We would like to share some common-sense techniques that we have found effective.

A BMO can use FM 71-2 to begin organizing his maintenance assets. These assets are aligned by MTOE (modified table of organization and equipment) for better control of maintenance operations both in garrison and in the field.

The unit maintenance collection point (UMCP) is the focus of a task force's primary tracked vehicle maintenance. The battalion maintenance section assumes complete responsibility for a piece of equipment from the time it arrives in the UMCP until it is returned to its company.

We have found that a few additions to the usual UMCP organization make the task easier. First, an administrative center, which can be in a built-up M105 trailer or an M35 series truck, will improve the BMO's ability to control the work within the UMCP as vehicles arrive for repair.

Then, several key systems need to be developed and placed in the administrative center. These include a status chart, manuals, forms and supplies, and the necessary communications equipment.

An effective status chart that monitors non-mission capable (NMC) vehicles is essential. The chart should allow the BMO to track the vehicles by type, bumper number, current serial or USA number, the reason it is listed NMC, the date it was listed, and its current location. The chart should also show the task organization for each company or team.

Manuals through the -34 and -34P level should be maintained in the center for ordering parts and assisting in the repair of each combat system in the task force. For an infantry task force, this must include hull and turret tank manuals. Company maintenance teams should not be relied upon to make these manuals available, because they are well forward and too busy to help in this area.

FIELD DESK

The center should also contain the equivalent of a field desk with all the current maintenance forms and office supplies that will be needed during field operations. A radio with OE-254 antennas and a map with the graphics for maneuver and logistics posted on it is also helpful.

Once the base operations are established, the BMO should move to organize the rest of the UMCP. A mechanic of each MOS should be present. (In an infantry task force, tank hull and turret mechanics are commonly overlooked, as are those in power generation and communications MOSs.) A complete Number 1 or 2 common tool set should also be an integral part of the UMCP.

The BMO should try to carry enough packaged POL (petroleum, oil, and lubricant) products to change two major assemblies for each different type of combat system. Brake and hydraulic fluids also should be carried in addition to antifreeze and GAA (grease, artillery/automotive) lubricants. An M105 trailer works well for this task. Requisitions using the LOGPAC (logistical package) system to replace the quantities used should keep the UMCP entirely self sufficient.

A direct support (DS) contact team should also be in the UMCP. Pre-positioning selected major assemblies can significantly reduce the turn-around time for vehicles. Soldiers with armament and fire control specialties should be in the center, too, to help the organizational mechanics with diagnosis and repair. This combination will greatly improve a task force's ability to fix forward. In addition, the BMO should not overlook the integration of Air Defense Artillery and Engineer maintenance assets into the UMCP organization.

As damaged and NMC vehicles arrive in the UMCP, a triage system should be followed, much like that in a medical unit. A priority of vehicle repair should be established quickly, and cross leveling decisions made and carried out. The vehicle crew should complete a thorough preventive maintenance checks and services (PMCS) and turn in a completed DA Form 2404 to the battalion maintenance officer or team. Any parts that are available in the UMCP should be in-

stalled on the vehicle while it awaits further repair for NMC faults. Finally, the vehicle should be incorporated into the defensive plan for the UMCP or the combat transportation command post.

Another practice that will pay dividends is to have night-time repairs made by the task force mechanics. Although this is slower and more difficult, a good unit can repair vehicles 24 hours a day.

Finally, an SOP that outlines the specific movement instructions and the physical setup of the UMCP will make these operations easier to carry out. In addition, the soldiers should practice moving and setting up the UMCP during both daylight and darkness until they become proficient at it. (One possible UMCP arrangement is shown in the accompanying diagram.)

Unfortunately, maintenance operations usually do not receive much attention during a task force's operational planning, even though detailed maintenance planning before a combat operation can save a BMO hours of precious time. Several maintenance problems that are inherent in sustained operations should be addressed during the planning phase.

For example, a recovery plan is needed for any units operating forward in the task force sector without their organic support, and the BMO must know which units are forward.

One M88 positioned forward can greatly assist in this task. The recovery plan, of course, must be coordinated closely with the forward units. Another method is to place recovery vehicles with the forward medical aid station, so long as time is allowed for briefing the forward recovery sergeant and seeing that he understands his mission.

In addition, the scout, mortar, Air Defense Artillery, Engineer, smoke, and ground surveillance radar platoons attached to the task force will have specific recovery needs that must be considered. The tank platoons cross attached to infantry teams will also need to be considered in recovery planning.

The BMO, in developing the recovery plan, can use a matrix to delineate the recovery responsibilities for the special platoons. At the same time, the BMO should ensure that his taskings support the plans prepared by the S-4 and the medical section. Tasking one company team for recovery evacuation and another for medical evacuation only adds confusion to the service support annex.

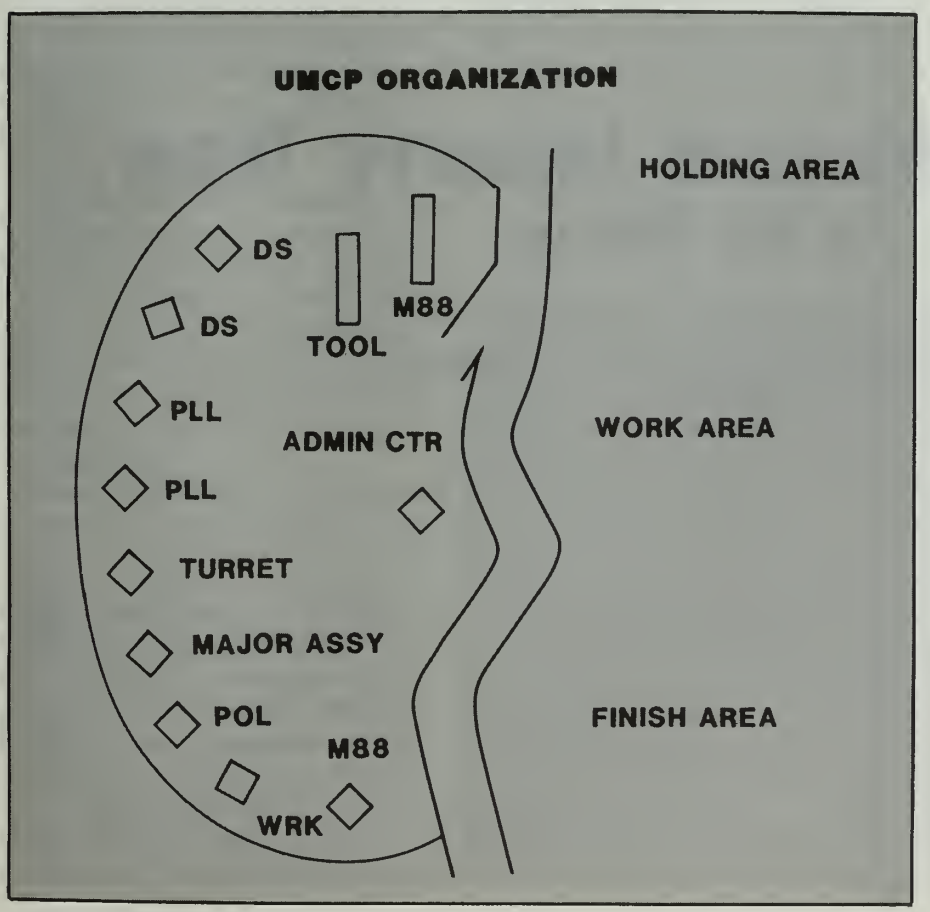
When possible, the BMO should attend the presentation of the task force operations order (OPORD). This will give him an opportunity to coordinate with the special platoon leaders and any newly attached company commanders. (He should later make every effort to give an OPORD to the maintenance personnel in the UMCP. A soldier who is informed will execute his mission much better than one who does not know what is going on.)

The BMO should develop a system of identifying NMC and battle damaged vehicles, and his system should address the problem of identifying them. A VS-17 panel or flag can be used during the day, and chemlights arranged in some geometrical shape can be used at night. These simple steps will help tremendously in battlefield evacuation.

A good preparation effort will improve the task force's ability to win the battle. The BMO must always be prepared to give the task force commander an accurate vehicle status report, including those that can be repaired. A command decision to cross-level units must be executed quickly, so that maximum combat power can be placed forward to influence the battle.

All of the task force's recovery vehicle crews should be completely familiar with the routes to the company battle positions or to prearranged maintenance collection points. In turn, company recovery vehicle crews should rehearse their routes to the UMCP. (A track commander (TC) and driver can conduct the rehearsal in a wheeled vehicle.) Logistics overlays should be posted to the maps in all vehicles.

A well disciplined unit makes maintenance part of its daily routine. If each vehicle in a task force is equipped with a -20P (parts manual), for example, the benefits can be enormous. Since a track commander is the one who has primary interest in the repair of his vehicle, he should be the one who is responsible for ordering parts for it. If individual soldiers



are assigned specific responsibilities, breakdowns in the system will be easier to identify and fix.

The key to ensuring that Class IX repair parts are ordered and received is to control the DA Form 2404 and the repair part as they move through the system. Thus, during maintenance halts, we have each TC fill out a DA 2404 with the vehicle fault and the national stock number (NSN) of the needed repair item. He gives the form to the motor sergeant, who conducts quality control checks. Once the motor sergeant has ensured that he has a 2404 for each vehicle, he gives the forms to the supply sergeant during normal LOGPAC operations. (Withholding Class I supplies from a unit until this is completed can quickly bring this point home to the crews.)

When the supply sergeant returns to the brigade support area (BSA), he gives the 2404s to the battalion motor sergeant (BMS), who performs another quality control check for proper priority and accurate parts information. He gives the forms to the individual prescribed load list (PLL) clerk, who verifies it for valid NSNs and recoverability codes. The clerk pulls the parts he has on hand and enters the document number on the 2404 for those he must order. He gives the annotated 2404 and the repair parts to the supply sergeant for return to the motor sergeant.

The last step in the process is to return the annotated 2404s and parts to the TCs, who write the appropriate entries on their DA Forms 2408-14. To ensure the smooth flow of information from TC to BSA and return, leaders should see that painstaking exercises using the system are conducted at every training opportunity.

Finally, the UMCP needs to have a plan for reacting to a possible enemy attack. Good security, combined with excellent use of camouflage nets, will increase the UMCP's survivability. The use of roving patrols and listening or observation posts should not be ruled out.

The BMO also must have a plan for returning the vehicles to their respective units when they are ready. If this cannot be done before the battle, even an outstanding repair effort may be in vain.

The UMCP should make every effort to move with the combat trains to ensure there is a unity of effort in combat service support operations. That effort can do much to improve a task force's ability to conduct sustained operations.

Good maintenance is not easy. It requires organization, planning, intensive preparation, and ruthless execution. But maintenance is a combat multiplier that a mechanized task force must use to the fullest if it is to succeed.

Captain Mark A. Meaders has served as a Cavalry squadron maintenance officer in Germany, an Armor battalion maintenance officer at Fort Carson, and as the battalion maintenance observer-controller for the mechanized infantry task force trainers at the National Training Center. He also commanded a tank company at Fort Carson and is now an Armor company trainer at the NTC.

Captain Rick Baillergeon served in numerous opposing force assignments before becoming a platoon observer-controller for the mechanized infantry task force trainers and a maintenance observer-controller at the NTC. He is now attending the Armor Officer Advanced Course.

The Mechanized Infantry Team
In the Offense

LIEUTENANT COLONEL THOMAS V. MORLEY
CAPTAIN ANTHONY J. TATA

In a mechanized infantry team, proper teamwork between the tank and infantry platoons on the objective can devastate even the most heavily prepared defenses. An infantry team commander must understand, though, that while his infantry is indeed deadly from 1,000 meters in toward the objective, it is the tanks that give him his long range killing power, and they are sure to be the enemy's primary target. The tank platoon must therefore be preserved during movement so it can provide enough firepower on the objective to support the mechanized team in its efforts to destroy the enemy.

The movement formation a team uses should allow the commander to make contact with the enemy with a relatively small element while still retaining freedom of maneuver for the bulk of his force. That formation should also facilitate his command over and control of his fighting units and allow him to maintain the momentum of his attack.

In discussing formations for a mechanized infantry team, however, the cur-

rent manuals mention only two—one with an infantry platoon in the lead and the other with a tank platoon in the lead. In the usual tank-led formation—and the one taught in the Infantry Officer Advanced Course—all four tanks lead in a wedge while the two infantry platoons move on the flanks with the team commander in the center and the executive officer (XO) with the platoon on the left. Unfortunately, if all the tanks are destroyed—as often happens in our training—the team is rendered ineffective before it even reaches the objective.

Another formation has proved its worth in numerous force-on-force battles using MILES (the multiple integrated laser engagement system). In this formation, one tank section leads the infantry platoons and the other trails (Figure 1).

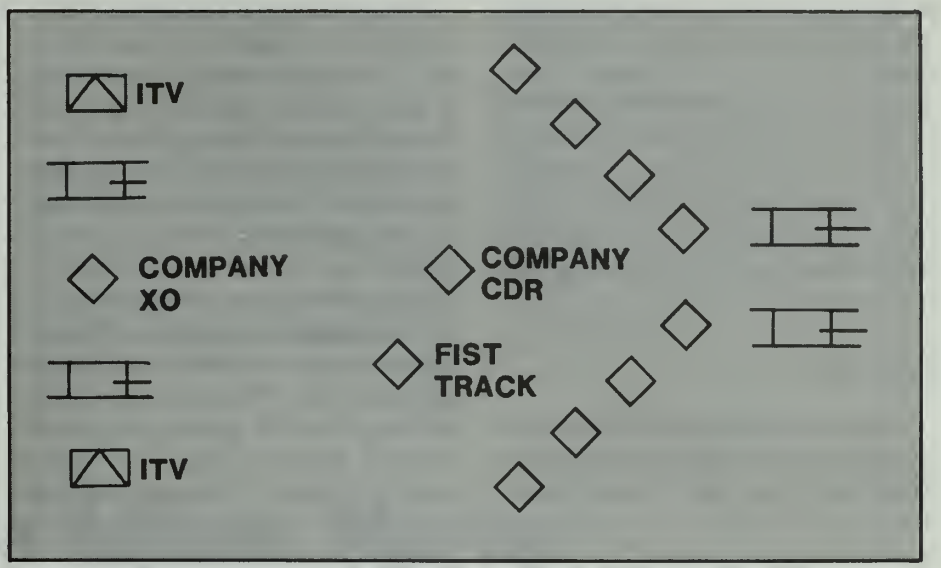


Figure 1

During the approach march and before any contact, the two trailing tanks, with proper gun tube orientation, can increase the security of the formation to a true 360 degrees. Instead of having four tanks scanning forward and to the flanks, two can do that while the other two observe to the rear and the flanks. As the team approaches its objective, the two lead tanks can provide supporting fire while the rear tank section gives the commander many opportunities for maneuver.

With only two tanks leading, the team is far better able to accomplish its mission—either by destroying an enemy force or by seizing an important piece of terrain. As the company moves into an enemy engagement area, for example, the lead tanks may be destroyed, but the rear tanks will probably survive the initial engagement.

These two remaining tanks still give the commander a formidable force with which to complete his mission. They offer him accurate direct fire, thermal acquisition capability, and more survivability from indirect or direct fire. The rear tank section, in concert with the infantry platoons, are available to destroy the initial enemy force and continue on to the objective. The tanks can then select firing positions from which to pin down or destroy one of the enemy's stationary forces, or the team commander can use tank-infantry teamwork to maneuver his infantry forces to dismount points to destroy the enemy's vehicles (Figure 2).

If this team's initial engagement happens to be with the lead elements of a moving or attacking enemy force, this split tank section formation also gives the commander some decisive advantages. The rear tank section can find hasty firing positions, for instance, to support the forward infantry platoons, which can rapidly dismount their antiarmor teams to destroy the attacking enemy forces. If the infantry platoons are equipped with Bradley fighting vehicles (BFVs), the vehicles' chain guns and TOW missiles will provide even more depth to the battlefield (Figure 3).

The split formation also enables the tanks to conceal more of the team with smoke during movement; regardless of the direction of the wind, one of the tanks will be able to provide effective concealment.

Additionally, if the team receives harassing fire from a small outpost, the commander can use one section or the other (or one of the tanks designated as a "killer tank") to suppress the enemy while his team continues to maneuver toward the objective. (The commander should try to identify his most potent "killer tanks" during training. Then he

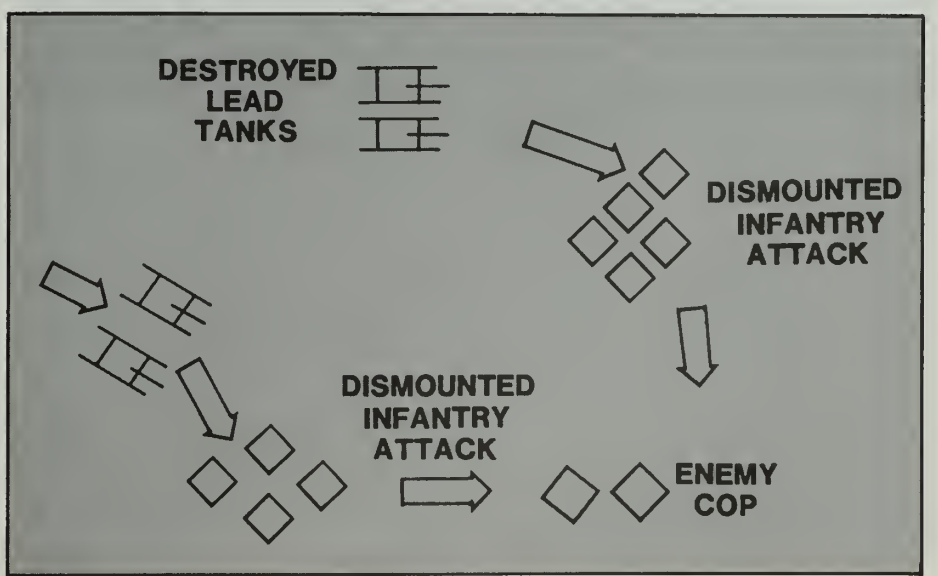


Figure 2

should stay aware of where these tanks are in his formation so he can call on them in this type of situation. Once again, this type of preplanned response to enemy fire increases the formation's security and helps keep the commander from getting caught up in the wrong fight.) Speed and terrain driving must serve as key elements to protect the lead tank section.

CRITICS

Some critics may believe that it is not tactically sound to split the tank platoon. Others may claim that the tank platoon leader will not really be in charge of maneuvering his platoon. This may be true, but we believe this formation better serves a team commander in carrying out a mission for the following reasons:

- Command and control remains focused on a team made up of two tanks.
- Each tank section is commanded by an experienced leader—either the platoon leader or platoon sergeant.
- Mutual support is available between the sections for any deliberate attack.

Other techniques can be used to increase the security of this formation during movement, which allows the team to move rapidly without excessive fear of ambush or surprise.

During times when enemy air attacks are likely, for example, a dedicated M113 or IFV from each infantry platoon can act as flank security, moving 200 to 500 meters to the team's flanks. These "outriders" should be as far from the team as the terrain permits so as to deny enemy helicopters the dominant overwatch terrain.

These vehicles should be allocated extra machinegun ammunition so they can suppress enemy helicopters or engage fast moving aircraft. The antiarmor weapons with these security vehicles can also effectively destroy or harass any enemy attack helicopters. (Certainly, the track commanders of these vehicles should be strong NCOs with sound judgment.)

Because the speed of the infantry vehicles is comparable to that of the tanks (M113s to M60 tanks and BIFVs to M1s), these outrider squads can quickly move back to their original stations during assaults. And as the terrain varies, so will their positions.

Normally, as terrain becomes more restrictive or dense, an attack begins to slow. The team commander must be flexible enough to tighten his formation to a column if necessary. He should also consider sending a "rabbit vehicle" forward. This vehicle, similar to the flank security vehicle, can act as the dismounted point man or the forward security element. It can race ahead, within overwatch range of the lead tanks, scout along the axis of advance, initiate the breaching of any obstacles, establish antiarmor ambushes, and provide detailed intelligence concerning the condition of the approach route before the rest of the team arrives at any chokepoints. By eliminating these nuisances and providing early warning along an axis, the rabbit vehicle enables the team to maintain its momentum.

In the split tank platoon formation, the commander can put the company or team executive officer in control of the rear tank section and any improved TOW vehicles (ITVs), either organic or attached. (Another interesting technique involves the use of TOW HMMWVs—high mobility multipurpose wheeled vehicles—as an additional attachment to the XO's section.) Thus, in any unexpected engagement area, the most likely overwatch elements are under the control of the XO and out of the initial kill zone. This, in essence, gives the team commander the freedom to maneuver his two infantry platoons and the remaining tank section either onto a piece of key terrain or against an enemy force.

While the commander maneuvers the infantry platoons, the company XO can establish a supporting overwatch element with the two rear tanks and the ITVs or HMMWVs. Under certain METT-T (mission, enemy, terrain, troops available, and time) conditions, this overwatch element can be used to exploit success on an alternate mobility corridor. An effective method in this situation is to have the XO lead his tanks on a diverging axis, forcing the enemy units either to stay in position to deal with them or to reposition some forces in their direction. This allows the company to destroy this fragmented force rapidly.

Likewise, the team's main body can maneuver against the bulk of an enemy force while the XO slips in on a separate axis and acquires enemy targets from the flank and rear. Tanks and TOWs are particularly good at bounding overwatch, because each tank can move safely within the protection of a TOW. In any case, the XO is truly a second in command or fighting XO.

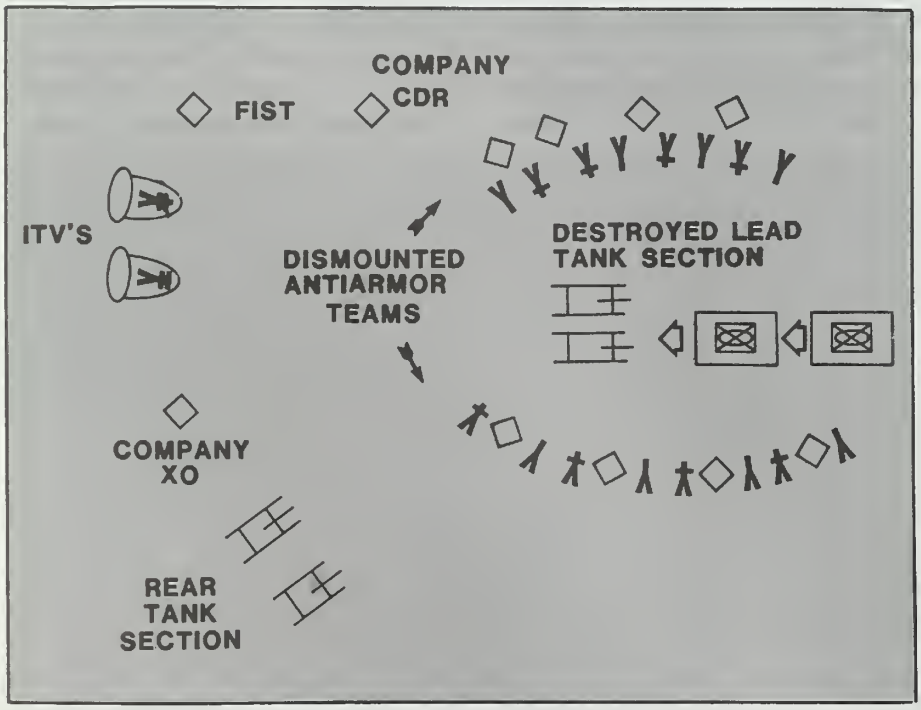


Figure 3

Because the company XO must also send reports on the battalion net, the formation of this extra maneuver element does create a radio frequency problem. The XO must monitor both the battalion and the company nets. One solution is to place the trail tank section on the company frequency with the XO, the commander, and the three platoon leaders. Until the company has made contact with the enemy, this section should be strictly in a listening mode.

All of these techniques have been used effectively during four major evaluated exercises in the past year—one at the National Training Center, one at Yakima Firing Center as the opposing force, and two in external evaluations at Pinon Canyon, Colorado.

Using these techniques, a mechanized infantry team commander can improve the survivability of his team and increase his chances of accomplishing his mission successfully.

Lieutenant Colonel Thomas V. Morley, an Armor officer, has commanded both infantry and armor companies and recently commanded the 2d Battalion, 35th Armor. He was an infantry platoon leader with the 101st Airborne Division in Vietnam. He is now attending the Army War College.

Captain Anthony J. Tata commanded a mechanized infantry company in the 1st Battalion, 8th Infantry, participating in major exercises as part of an Armor task force (2d Battalion, 35th Armor) in the 4th Infantry Division. He is now a Fellow in the Office of the Secretary of Defense.

The 60mm Mortar
How Good Is It?

CAPTAIN JOHN M. SPISZER

The Joint Readiness Training Center (JRTC) at Fort Chaffee, Arkansas, is the equipment and doctrine test bed for light, airborne, air assault, and Ranger units. One weapon system that all of these units have in common is the M225 60mm mortar. (See also "Light Infantry 60mm Mortar," by Captain Michael T. Natusch, INFANTRY, November-December 1976, pages 33-35; and "AOE and the 60mm Mortar," by Captain Morton Orlov II, INFANTRY, September-October 1987, pages 26-30.)

At the JRTC, this mortar, its employment, and the mortar section's capabilities are routinely observed, and on the surface it appears to be an ideal weapon: It is light, highly responsive, and can provide a high rate of fire in either an indirect or a direct fire role. It weighs 46.5 pounds (51.5 pounds less than the 81mm mortar); its highly effective rounds—high-explosive, white phosphorous, and illumination—weigh only three to five pounds each (five to seven pounds less than the 81). A new high-explosive round will have a range of more than 4,000 meters with a bursting radius of 29.5 meters—as effective as our current 81mm mortar ammunition.

The weapon can be fired in a handheld manner (total weight is only 18.5 pounds) out to 1,300 meters, using a trigger option instead of the traditional drop fire method. Furthermore, any soldier can learn to fire it this way in a matter of minutes.

Finally, and perhaps most important for the infantrymen whom this weapon is designed to support, two 60mm mortars are assigned to every light, airborne, and air assault company, and three to every Ranger company. In short, it is an infantry commander's own indirect fire support.

CURRENT ORGANIZATION

1 Section Leader (11C30)
1 Squad Leader (11C20)
2 Gunners (11C10)
2 Assistant Gunners/Ammunition Bearers (11C10)

TOTAL: 6 soldiers

Table 1

Observations at the JRTC suggest, however, that this portrayal may not be entirely accurate. There are definite problems. Two of the most obvious are the mortar section's organization and the current state of training and doctrine—specifically, the mortar's tactical employment and its ammunition supply and resupply.

An infantry company mortar section today is made up of two M224 mortars and six soldiers, organized as shown in Table 1. The section leader also acts as a gun squad leader, while either he or the squad leader acts as fire direction center (FDC) chief and computer. Usually one of the two must also act as the radio telephone operator (RTO) for the section. In other words, these six soldiers have at least nine specific functions to perform, possibly more.

Furthermore, despite its light weight, the mortar—with its associated TOE equipment, ammunition, and normal TA-50 soldier's load (including food

and water)—is still too heavy for a six-man section to carry. In addition to the two weapon systems, the mortar section must carry one M23 mortar ballistic computer, binoculars, aiming stakes, TA-1 and wire, one AN/PRC-77 radio, and up to six mortar rounds per soldier. Section personnel sometimes carry up to 40 pounds each in mortar-specific equipment, which is entirely too much if the soldiers are to travel long distances and still fight effectively.

Typically, mortar sections solve this load problem by leaving most of the equipment behind. They commonly carry only what is necessary to fire the weapon in a direct fire manner (18.5 pounds), some binoculars, and some ammunition. But this solution defeats the purpose of the weapon and makes it less effective. It limits the mortar to a direct lay/direct alignment role (line of sight and therefore more vulnerable), with a range of only 1,300 meters. And because aiming must be done by hand and eye, it is also less accurate.

The only true solution to the load problem is to increase the size of the section. Although this may seem like heresy in this age of budget restraints and troop reductions, it would spread the section's duties more equitably and would allow a greater distribution of equipment with lighter individual loads. The section could then carry all of the equipment it needs.

The organization I propose for the light infantry mortar section includes 11 soldiers, as shown in Table 2. This organization, by allowing each soldier to focus on one specific duty, would increase the section's effectiveness. Furthermore, a larger section could carry more ammunition, and this would increase its responsiveness and immediate fire support capabilities. The section would have to rely less upon the rifle platoons to carry the ammunition.

(The entire section should be armed with M16A2 rifles instead of 9mm pistols so that they would be better able to defend their position and their valuable weapons systems. Four soldiers in the current six-man section are authorized pistols.)

An alternative proposal (Table 3) takes into account the era of constrained resources into which the Army is moving. This organization is the minimum that could effectively accomplish the section's mission of fire support. It would increase the section's effectiveness by allocating the soldiers' duties more efficiently and by providing two more soldiers to carry the section's equipment. The present six-soldier section does neither.

AMMUNITION

The current organization also presents a problem with ammunition supply and resupply. The current doctrine and training guidance does not adequately address ways to get ammunition to the 60mm mortars in quantities that will make them most effective.

In defensive operations this has not been a problem, because the section is usually stationary and ammunition can be stockpiled at one or two positions. When a company is conducting offensive operations or is on the move, however, it can rarely take along more mortar ammunition than the mortar section itself can carry. Depending on what else each soldier must carry, this averages between 20 and 40 rounds for the section, a supply that can easily be fired in just one minute. And trying to conserve rounds by firing only a few at a time rapidly diminishes the weapon's effectiveness.

One answer is to carry more rounds, but the section's individual loads are already too heavy. The other answer is to have each soldier in the company's rifle platoons carry one or two mortar rounds, which would add 90 to 180 more for the section and vastly increase its capabilities. But when the section tries to consolidate these rounds when it stops and then attempts to redistribute what is left to the platoons' soldiers when the company begins moving again, more difficulties are created. On very few occasions when soldiers have tried this technique have they been able to do so successfully.

The only solution to this problem is for units to develop SOPs on how to distribute the ammunition among the soldiers or platoons, how to consolidate the ammunition where and when it is needed, and how to redistribute it again when the units move out. Then the units must actually practice these tasks during training exercises—using training rounds about the same size and weight as the real ones—not just simulate them.

At the JRTC, blocks of wood the same size as mortar round canisters are used. Each battalion should make, or have made, at least enough of these rounds (400 or more) for one company to use during field training exercises so that they can train on the supply and resupply of mortar ammunition. In addition, each company needs to train with the support platoon on the resupply of ammunition from the combat trains to the company, again using these training rounds.

No fancy tricks are involved, just realistic training instead of simulation. Commanders must ensure that they have their soldiers do in training, as closely as possible, exactly what they will do in combat.

Another problem has been employing the weapon. During the defense its use is well defined, and it is employed like any other mortar system. But in the of-

PROPOSED ORGANIZATION

1 Section Leader (11C40)
1 FDC Chief (11C20)
1 FDC Computer/RTO (11C10)
2 Squad Leaders (11C20)
2 Gunners (11C10)
2 Assistant Gunners (11C10)
2 Ammunition Bearers/Handlers (11C10)

TOTAL: 11 soldiers

Table 2

CONSTRAINED RESOURCE ORGANIZATION

1 Section Leader (11C30)
1 FDC Computer/RTO (11C10)
2 Squad Leaders (11C20)
2 Gunners (11C10)
2 Assistant Gunners/Ammunition Bearers/Handlers (11C10)

TOTAL: 8 soldiers

Table 3

fense, this weapon's responsiveness and man-portability open up new and distinct mortar employment techniques for the light infantry battlefield—techniques that are not recognized now because of a lack of doctrine on the subject.

One obvious technique—one that the 60mm mortar was specifically designed for and that units readily adopt—is to keep one mortar in the hand-held mode with the small base plate attached during movement so the section can engage targets of opportunity as the commander directs. This mortar can rapidly open fire on a designated target while the other is preparing to fire in the more accurate bipod mode using an FDC in a covered and concealed position. This will enable the section to provide rapid, continuous, responsive, and accurate fires while keeping its exposure to a minimum.

Another useful technique is to continue preparatory fires with the 60mm mortars after fires from the heavier weapons have been lifted or shifted. For example, during a company attack, as the fires from the 105mm howitzer and 81mm mortar are about to be lifted or shifted, the company's 60mm mortars (from defilade) can be adjusted onto the target. The company FSO (who is the mortar observer) can see the objective, is either with or within sight of the mortar section, and is on the company radio net. He can adjust the mortars to fire on the objective, or on a planned breach point without endangering the breach force.

To provide destructiveness and concealment, the mortar can fire high explosive and white phosphorous ammunition, and can maintain the fires long after the larger artillery and mortars (with a less controllable bursting radius) have been lifted.

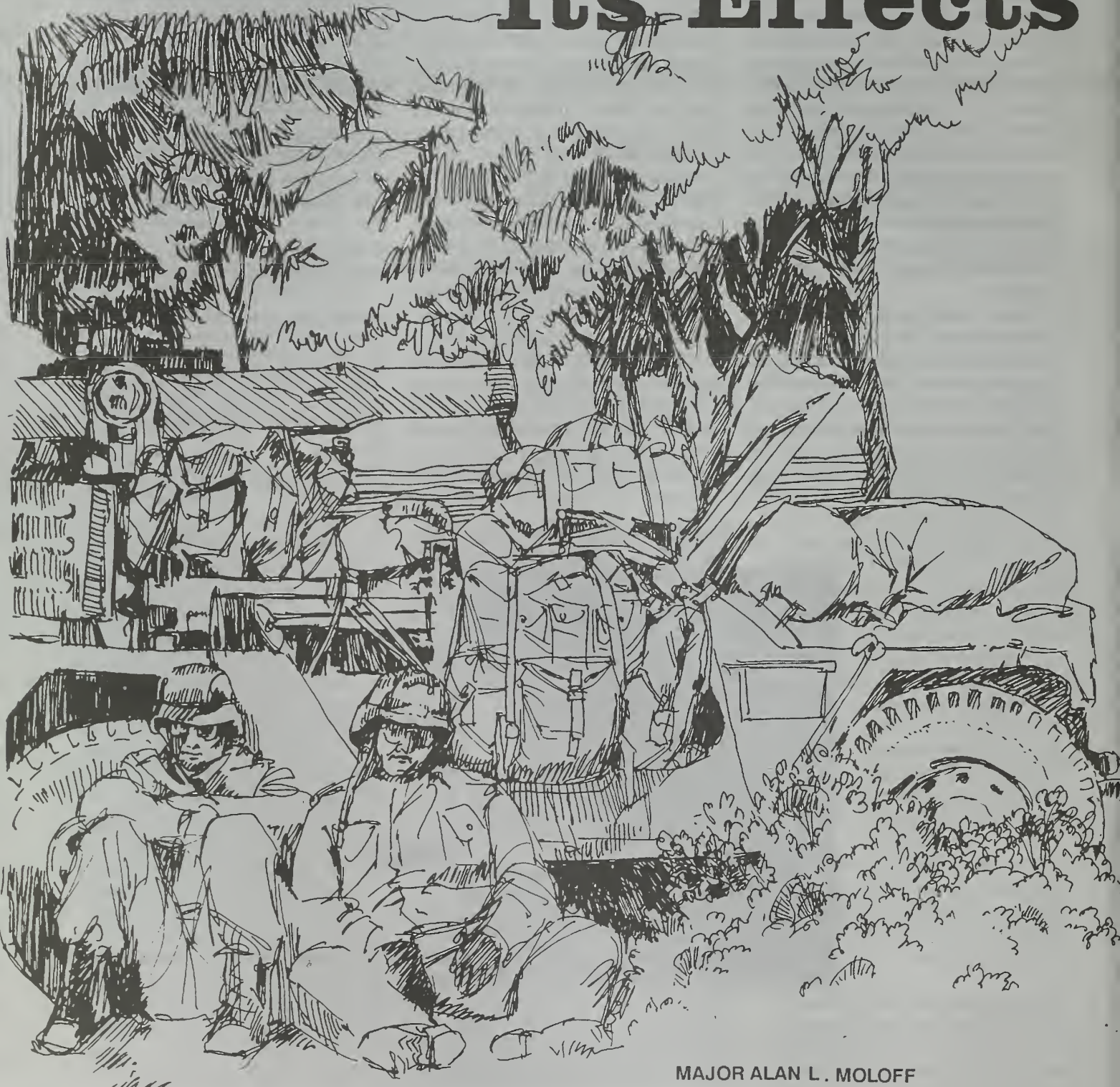
Current manuals such as FM 7-72, Light Infantry Battalion, give commanders numerous offensive and defensive techniques they can use. The same type of manual, or an addition to FM 7-90, Tactical Employment of Mortars, should be developed to help those same commanders employ the 60mm mortar to its fullest. (FC 7-90-1 touches on this, but only lightly.) It is hoped that these concerns will be taken into account as FM 7-90 is revised, for the manual needs to focus on the unique characteristics and capabilities of the 60mm mortar and its ability to play a more versatile role on the battlefield than its predecessors could.

Observations at the JRTC have proved that the 60mm mortar is a valuable asset to light, airborne, air assault, and Ranger company commanders. It is obvious, though, that with certain improvements this weapon can be made even more valuable. These improvements include a better organization, realistic (rather than simulated) ammunition supply and resupply training, and more emphasis on exploring employment techniques and updating training doctrine.

Observations from the training centers have led to useful weapon improvements in the past. It is clear that they can also lead to useful 60mm mortar improvements today.

Captain John M. Spiszer has served as a battalion mortar platoon leader in Korea and as a mortar platoon observer-controller at the JRTC. He is now a force development and modernization officer with the 63d Army Reserve Command in California. He is a 1984 graduate of the United States Military Academy.

Sleep Loss And Its Effects



MAJOR ALAN L. MOLOFF

The key to winning a battle, according to Field Manual 100-5, is to achieve and maintain the initiative. This means that battles in the future will have to be fought in depth, and that they will also require continuous and timely combat support.

The Soviets' doctrine, for example, calls for fighting along a broad front, in any weather, until their enemy has been defeated. The Soviets plan to echelon their forces to relieve exhausted soldiers so that continuous unrelenting pressure can be applied to the enemy.

In any future war, U.S. soldiers in both continuous operations and sustained operations will have to perform their missions without regard to weather or time of day and for extended periods without adequate rest and sleep.

Unfortunately, though, the Army does not seem to be preparing for this kind of battlefield. Most of our field exercises and training and evaluation exercises are short and use repetitive and "canned" scenarios. Both of these factors contribute to the perception that leaders can perform well with little or no sleep. The effect of this misperception will become painfully obvious during the next protracted, rapidly changing battle.

Sleep is a serious matter that deserves the same concern from commanders at all levels that they now have for water discipline. They must understand that depriving soldiers of sleep during training exercises will not "inoculate" them against the effects of sleep loss during future operations any more than depriving them of water during training will prepare them to function without it on the battlefield.

A discussion of some of the aspects of sleep may lead to a better understanding of the need for sleep discipline. First, though, the following terms need to be defined, as they apply to this discussion:

The term *continuous operations* is defined as continuous land combat with *some* opportunity for sleep, although the sleep may be brief and fragmented. *Sustained operations* is defined as continuous land combat with *no* opportunity for sleep.

The word *sleep* itself is more difficult to define precisely, although many descriptions of it are available. One dictionary, for example, defines sleep as "a natural, regularly recurring condition of rest for the body and mind, during which the eyes are usually closed and there is little or no conscious thought or voluntary movement."

A sleep state can be recognized by the electrical activity of the brain, which shows patterns distinctly different from those that appear during periods of wakefulness. During sleep, there are also changes in the levels of various hormones, and these changes, which occur in approximately 24-hour cycles, are partially responsible for the phenomenon known as *circadian rhythm.*

Other factors involved with circadian (daily) rhythm and sleep are environmental agents or events known as *zeitgaebers* —sunrise, sunset, mealtimes, and work cycles—that provide the stimulus for setting or resetting the biological clock. (Circadian rhythm is less pronounced in people who work different shifts, and experiments performed in a "*zietgaeber*-free" environment have demonstrated a physiologic day of about 25 hours instead of 24.)

Sleep deficit is defined as the total amount of sleep that has not occurred because of sleep deprivation and inadequate sleep. *Sleep deprivation* occurs when a person has had no sleep for more than 18 hours. It is generally recognized that sleep deficit can be determined by comparing the actual amount of sleep obtained to the usual eight hours per 24-hour period. This loss of sleep will commonly manifest itself as fatigue, or a reduced capacity for work as well as reduced efficiency.

The sleep-related problems that military units experience begin during the initial notification period and continue through their deployment and initial battles. Sustained or continuous operations produce a significant sleep deficit.

Several studies that have examined the effects of sleep loss have shown generally that a person's cognitive or mental abilities deteriorate faster than his physical abilities.

One study, for example, measured the various military skills of three platoons of British soldiers. Some of the skills studied were encoding and decoding messages, map reading, preparing operations orders, and physical endurance. The soldiers of one platoon were not allowed to sleep at all during a nine-day operation; those of the second were allowed to sleep 1.5 hours a night; and those of the third, three hours a night. The soldiers were observed and judged by rested senior soldiers and were said to be combat ineffective when they could no longer accomplish the mission at a minimum acceptable performance level.

All of the members of the platoon that was allowed no sleep were rated combat ineffective after four nights. Thirty-nine percent of the platoon that was allowed 1.5 hours of sleep each night were rated combat ineffective after five nights, although 52 percent of them did finish the exercise. In the platoon that was allowed three hours of sleep a night, 91 percent of the soldiers completed the exercise.

ANOTHER STUDY

Another study, conducted by the Walter Reed Army Institute of Research, tested subjects who were required to perform a variety of cognitive tasks for 30 minutes of every hour for 72 hours. Their performance on all the tasks deteriorated at the same rate and closely paralleled the decline in their mood, motivation, and initiative.

Similar studies were conducted in a simulated message center in Canada and with fire direction center teams of the 82d Airborne Division at Fort Bragg. The soldiers in the Canadian experiment demonstrated stable performance for the first 18 hours, then a decline to 70 percent of baseline performance during the next six hours. Their performance again remained stable for the next 18 hours, but further declined to 40 percent during the next six hours. The performance of the fire direction center personnel of the 82d Division showed them to be combat ineffective after 48 hours without sleep.

In 1966, the Walter Reed Army Institute of Research made

Soldiers must nap during continuous operations and should nap as soon as possible in sustained operations.

the following observations concerning the decrease in performance due to sleep deficit:

- Sleep-deprived subjects demonstrated brief, intermittent lapses in response, and these lapses increased in frequency and duration as the sleep deficit increased. (These brief, intermittent lapses that are secondary to sleep deficit have been termed *microsleeps,* which are most frequent in the early morning hours between 0300 and 0500.)
- Intense, increased sensory stimulation, physical exercise, or shock, change in task, and feedback on performance tended to prevent or shorten these lapses.
- ''Overlearned'' or automatic task responses were relatively resistant to the effects of sleep loss.
- Many, but not all, tasks were affected by daily (circadian) influences and demonstrated decreased performance during the early morning hours.

Another study, ''The Operational Consequences of Sleep Deprivation and Sleep Deficits,'' reveals some specific effects of inadequate sleep on performance:

- After being awake for 24 hours, it is extremely difficult for a person to learn new tasks.
- Sleep deprived people sacrifice speed for accuracy whenever possible.
- The quality of performance drops more if the task is based on the ability to receive instructions as opposed to the ability to give them.
- The longer a task takes, the more sensitive it is to sleep loss.
- Immediate feedback on the quality of task performance reduces the effects of sleep loss on performance.
- The performance of difficult tasks or a series of simple tasks is more sensitive to sleep loss.
- Self-paced tasks are more resistant to sleep loss than work-paced tasks.
- Newly acquired skills are more sensitive to sleep loss than skills that have become ''second nature'' or automatic.
- A task that requires a short term memory chain is more sensitive to sleep deprivation.

Sleep loss significantly decreases cognitive performance, and some evidence of the decrease often appears before a person

even feels physically fatigued. The person's position or function in the organization determines the significance of his cognitive deficiency.

Decreases in the performance of aviators and leaders are particularly significant. In fact, there are rigid peacetime guidelines for aircraft crew rest standards (as shown in Army Regulation 95-3). (It is uncertain what those guidelines might be in wartime.) These crew rest standards are based on a study performed by the U.S. Army Aviation Research Laboratory, which used questionnaires given to instructor pilots and initial entry rotary wing students. The standards were not based on objective, physiologic data, wartime mission requirements, or high-stress mission profiles. Unfortunately, there has not been any definitive research and development leading to work-rest guidelines for leaders.

An ongoing study by the Aviation Research Laboratory is trying to measure, by means of a wrist-motion detector, the amount of sleep various officers and NCOs get during field exercises. The initial data indicates that, during a typical field exercise, it is the battalion commander and the operations officer who suffer the greatest sleep deficit.

Four hours of sleep for each 24-hour period is essential for long term functioning, and a lack of sleep is cumulative. Soldiers who get no sleep at all (as in sustained operations) are much less capable than those who get an inadequate amount of sleep (as in continuous operations). And their performance continues to diminish until the sleep deficit is made up.

Recovery from sleep deficit varies with the severity and duration of the deficit. Soldiers must nap during continuous operations and should nap as soon as possible in sustained operations. And if naps are important for soldiers, they are even more important for leaders and personnel in positions that require cognitive performance. Naps as short as 30 to 60 minutes have been shown to improve performance significantly. A sleep-deprived soldier or leader will benefit from any amount of sleep, but the recuperative value of sleep declines as the sleep becomes more fragmented.

Since circadian rhythm is the result of complex hormonal interactions on the mind and body, and since these patterns include functional performance peaks and troughs each day, naps are most beneficial if they are taken during the naturally occurring troughs. In most people, these occur between 0300 and 0600 and between 1600 and 1800.

Circadian rhythm also affects soldiers in two other major operational areas: The first is the alteration or mismatch of circadian rhythm to activity cycles in moving from one time zone to another during deployment, and the second is the requirement to perform "round the clock."

Until this century, long marches and slow sea travel allowed for gradual circadian adjustment to changes in time zone. Today's rapid air travel and short- or no-notice deployments do not allow for such an adjustment, and it is also impractical to change meal or work-rest schedules before deployment. It is possible, however, to schedule air travel with circadian resynchronization in mind. For example, a 1700 departure from the United States for a deployment to Europe would allow troops to land in Germany around 0700 local time. The soldiers, already sleep-deprived from deployment activities, would get some rest during the flight and wake up in the early morning hours at the new location.

The higher a unit's state of readiness is before deployment or sleep deficit, the better the soldiers' performance will be. Readiness in this context includes such diverse areas as the physical aspects of being well fed, well nourished, and well hydrated. If any of these is deficient, the performance decline that is related to sleep deficit will be magnified. It is interesting to note that while high levels of aerobic conditioning do not reduce the decreases in cognitive performance due to sleep loss, they will improve recovery from that loss.

All personnel must be "overtrained" in their individual tasks so that their performance will be less degraded by sleep deficits. This requires using standing operating procedures during individual and unit training. "Overtraining" makes tasks almost reflex actions, and physiologically changes complex tasks into simple ones.

Rotating the soldiers' duties will keep them more alert and improve their performance on a multitude of tasks. This is especially important for soldiers in passive positions that require them, for example, to monitor radios and radar screens. But duties can be rotated only if the personnel are adequately crosstrained, and the duty rotation, therefore, must be based on the aptitudes and training of the individual soldiers and on unit requirements. For aviators, the rotation of duties could be as simple as frequently trading piloting and navigating duties.

Tasks that require short term memory are highly sensitive to sleep loss. In combat, some examples are fragmentary orders, radio messages, fire mission and medical evacuation requests, and flight information instructions. During continuous and sustained operations, soldiers must read back messages to ensure their accuracy and should transmit information in written form whenever possible. This technique forces both the writer and the reader to concentrate during the information transfer. Additionally, the written message allows the reader to consume and review the information at his own pace, and this reduces the effects of his sleep loss.

It is time the Army recognized that too little sleep, like too little water, is a serious threat to our battlefield performance during continuous and sustained operations. It is time we made an effort to enforce sleep discipline among our soldiers and leaders just as we enforce water discipline.

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Demolition Training

LIEUTENANT THEODORE H. RHODES

Infantry units have an opportunity to train with demolitions and explosives about twice a year. Even when this training is conducted well, however, it does not always focus on the tasks that are critical to these units—usually because the trainer does not know which demolition skills are the most important to an infantry unit's combat mission. This wastes expensive training materials and valuable training time.

For these reasons, I would like to share a standard demolition training program developed at Schofield Barracks, Hawaii, that covers all the basic skills an infantry company needs to accomplish its combat mission. (A sample training schedule is shown in Table 1, and a sample list of the demolitions and explosives needed is shown in Table 2.)*

The program starts with a battalion level train-the-trainer course. The trainers, if possible, should be NCOs who have had previous experience working with explosives. Local engineers can help; it's their job to maintain the standard. At Schofield Barracks, for example, the instructors and range safety officers must be certified by engineers in a two-day course of classroom instruction before they conduct training with demolitions. Schofield Barracks also has an annual recertification requirement.

Once this battalion cadre has been trained, the trainers are sent to conduct the main-body training at company level. The initial training, which begins at skill level zero, takes five days—two days in the classroom and three on the range. The refresher training conducted six months later consists of three days of training—one in the classroom and two on the range.

The first classroom day of the initial training phase introduces the soldiers to explosives and demolition materials. (See Chapter 1 of FM 5-25, Explosives and Demolitions.) This introduction includes the tools the soldiers will be using, such as the components of nonelectric and electric demolition kits, the different uses and characteristics of each explosive, and the relative effectiveness (RE) factors, which compare the power of explosives to that of TNT. Although the soldiers do not have to memorize the RE factors, they should know which explosives are more powerful than others and which material each is best used against. Seeing the detonating velocity for each explosive will help them understand this relationship.

One of the most critical demolition tasks to be included in this instruction is calculating the time fuses, because a miscalculation could cause death or injury. The engineers at Schofield Barracks teach an accurate method of calculating a time fuse that detonates a charge to the very second. This process, which is not listed in any reference that I have found, is explained in the accompanying box.

At the end of this block of instruction, the soldiers should complete several practical math exercises until all of them are proficient in calculating the length.

AUTHOR'S NOTE: I would like to express my appreciation to Sergeant First Class Ronald W. Ricci for his assistance with this article.

The next block of instruction covers the construction of three different types of firing systems—electric, nonelectric, and dual combination. It also includes constructing the initiating system (fuse igniter, time fuse, and blasting cap) and priming and detonating cord knots.

The most commonly used system, the nonelectric firing system, has three components—the igniter, the initiator, and the ring main. The igniter used is, of course, the M60 fuse lighter, which ignites the M700 time fuse. The time fuse with a nonelectric blasting cap initiates the detonation to the ring main, a loop of detonating cord that carries the explosive shock wave to the branch lines. A branch line (two lines if the charge is dual primed) connects the ring main cord to each charge. The purpose of the branch line is to complete the chain of detonation and carry the shock wave to the charge.

This block of instruction ends with a practical exercise that will put together everything the soldiers have learned thus far. The students use inert electric and nonelectric demolition kits to construct all three firing systems. If this is not possible because inert kits are not available, the soldiers should at least have an opportunity to prime a block of explosive, tie demolition knots with detonating cord, tie a Western Union pigtail splice with inert electric caps, and simulate crimping a nonelectric cap to a time fuse.

The next block of instruction, which covers safety, outlines the minimum standards for transporting and storing explosives. Light infantry soldiers need only to know how to transport and waterproof explosives they carry in their rucksacks. But noncommissioned officers must also know how to store and transport large amounts of explosives in the event they are required to serve as range ammunition or battalion ammunition NCOs in the field trains.

It is not necessary to teach the soldiers how to calculate (using the cubed root formula) the minimum safe distance from which to observe detonation, but they should be taught how to use the minimum safe distance table on GTA (Graphic Training Aid) Card 5-10-28.

The next class teaches the infantrymen how to employ a demolition ambush. Because of the variety of demolitions that can be used in an ambush, this class should be divided into five subclasses: daisy chained claymores, field expedient claymores, indirect fire rounds, grenades, and ditch charges.

Daisy chaining puts multiple claymores on the same charge by linking them with detonating cord so they will detonate simultaneously. The most common method of daisy chaining is to run the detonating cord from one mine to the next. A method that is the quickest and the easiest to prime, and one

CALCULATING A TIME FUSE

1. Determine the burn rate for the time fuse you are using by test burning a three-foot section and dividing the total number of seconds it takes by three to get the average seconds per foot.
2. To get the total desired burn time expressed in seconds, multiply the desired burn time by 60.
3. Divide the desired burn time in seconds by the burn rate to get the total length of fuse you will need in feet. Carry the division out to two places past the decimal. (The numerals before the decimal represent whole feet, the numerals after the decimal represent the remaining hundredths of a foot.)
4. To isolate the whole number, subtract the numbers following the decimal (the first remainder). To convert this first remainder from hundredths of a foot to twelfths of a foot (or inches), multiply the remainder by 12. This gives you the total inches of time fuse required after the last whole foot.
5. Subtract again all the numbers after the decimal (the second remainder) to get the number of whole inches. Then multiply the remainder by 16 to get the total number of sixteenths of an inch after the last whole inch. Round this remainder upward if it is .5 or greater.
6. The exact length of fuse needed is the total number of feet, inches, and sixteenths of an inch.

EXAMPLE: If you want 8 minutes of time delay, and the cord's burn rate is 43 seconds per foot:

Multiply 8 by 60 to get the number of seconds of time you need, 480. Divide 480 by 43, which equals 11.16. Subtract the remainder .16 from 11.16, which leaves 11. This represents the number of whole feet.

To get the inches remaining, multiply .16 by 12, which equals 1.92 inches. Then subtract .92 from 1.92 to get 1, or the number of whole inches over whole feet.

To get the sixteenths of an inch remaining, multiply .92 by 16, which equals 14.72. Round this figure upward to get 15/16ths of an inch.

The total length of fuse you need is therefore 11 feet, 1 and 15/16ths inches.

SAMPLE TRAINING SCHEDULE

DAY 1

0900-1030 Demolition materials
1030-1115 Calculation of time fuse
1115-1200 Firing systems
1300-1430 Construction of firing systems, PE with inert demo
1430-1630 Demo ambush, grapeshot charge, ditch charge

DAY 2

0900-1200 Calculation and placement of charges
1300-1430 Safety
1430-1500 Classroom course review
1500-1530 Written test
1530-1545 Test review
1545-1630 Briefing on the next three days of range training

DAY 3

0800-1200 Firing systems
1200 Release of main body of company
1300-1630 Demo ambush, ditch charge, grapeshot, daisy-chained claymores

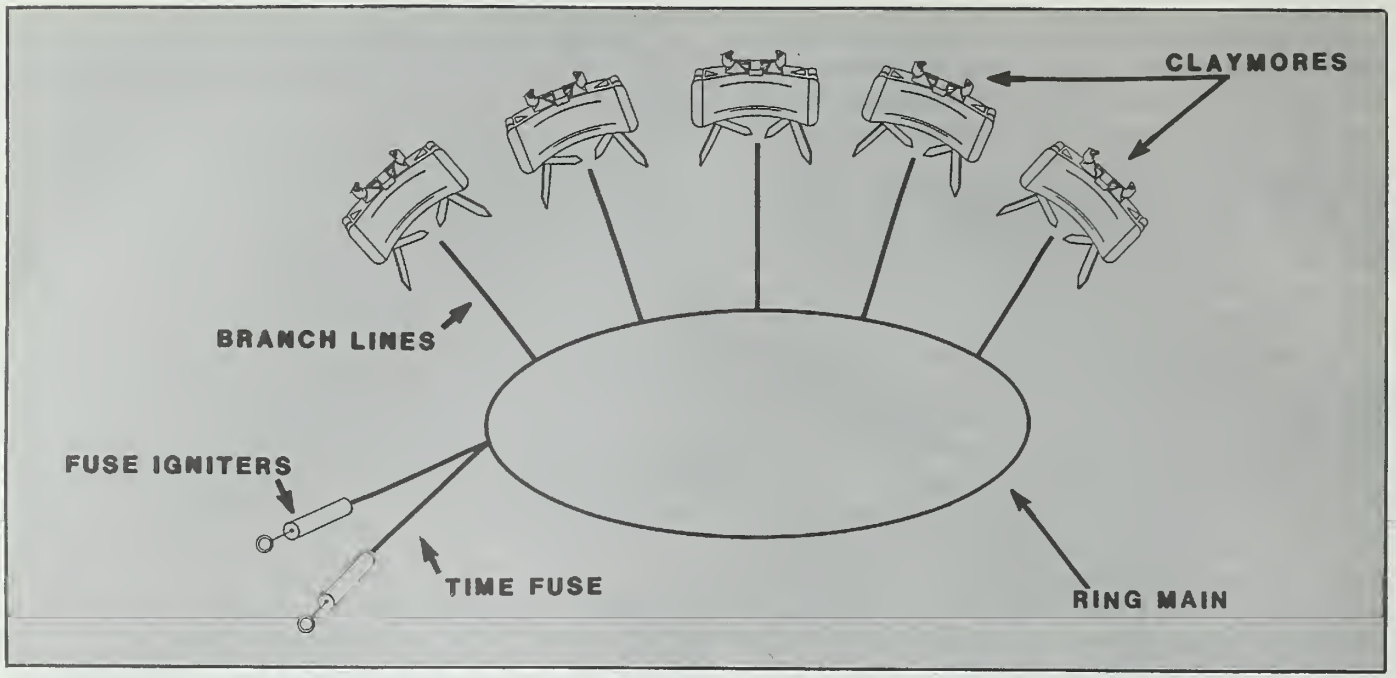
DAY 4

0800-1200 Introduction to engineer charges: shaped charge, cratering charge
1300-1630 Calculation and placement of charges

DAY 5

0800-0930 Entire company reunites, platoons establish assembly areas
0930-1000 Platoons draw ammunition, platoon leaders receive operations order
1000-1200 First platoon goes through course
1230-1430 Second platoon goes through course
1430-1630 Third platoon goes through course

Table 1



that ensures positive detonation for all the claymores, is to lay out a ring main and tie off one branch line for each claymore. You may use two branch lines if you want to have dual-primed claymores. A nonelectric blasting cap is crimped to the other end of the branch line and primed in the fuse well of the mine. Each claymore now has its own independent branch line off the ring main, and one dud claymore will not block the chain reaction and keep it from going on to the others down the line.

The field expedient claymore (the grapeshot) is used when standard claymores are not available. In this method, the bottom of a number 10 can (the kind a mess hall gets its canned peaches in) is stuffed with two pounds of C-4 explosive, smoothed flat. A rag or piece of cardboard is put over the explosive to act as a buffing material. The rest of the can is filled with nuts, bolts, expended brass, rocks, or anything else that makes a good projectile and the opening is taped to keep everything in. Then the C-4 is primed through a hole punched in the bottom of the can (see Appendix C, Field Manual 5-25).

The next subclass teaches how to incorporate indirect fire munitions into a demolition ambush. The munitions to use in this block are 60mm, 81mm, and 4.2-inch mortar rounds. To prime these rounds, one-third of a block of C-4 explosive is taped to their widest part to ensure detonation. When the rounds detonate, they have a massive shrapnel effect; they are even more effective if they are hung from trees.

Finally, the soldiers are shown how to incorporate grenades into an ambush. These can include fragmentation and white phosphorus grenades, or even smoke grenades if they want to screen an assault. All the pins of the grenades are pulled, the ring main cord is run under the spoons of the grenades, and they are taped down with electrical tape. This will give a delayed blast after the main blast. The detonating cord under the spoon will not detonate the grenade. For immediate detonation, the fuse of the grenade can be unscrewed and a golf-ball size clump of C-4 explosive packed into the fuse well and primed either with a blasting cap on the end of the branch line or with an overhand knot of detonating cord.

For a ditch charge (a separate charge but an integral part of a demolition ambush), three or four strands of detonating cord are taped together for the length of the desired kill zone. Nails are taped around the entire length of cord, and this charge is placed in a ditch in the ambush kill zone. The charge is camouflaged with earth and debris, primed with an electric blasting cap and firing wire (perhaps left over from one of the daisy chained claymores). When the ambush is activated, and the enemy takes cover in the ditch, someone sets off the firing device.

It is important for the soldiers to know how to calculate charges using various types of explosives against different types of material. Here again, they need not be taught all the mathematical formulas for each charge, but they do need to learn how to use the calculation tables on the GTA card.

The abatis charge for antiarmor ambushes and the concrete-breaching charge for urban operations are of particular interest to infantry units. The soldiers should know how to compute the total amount of explosive required when using multiple charges. They should go through several practical exercises during which they must calculate the total amount of explosive to use and the size of each charge.

This two-day classroom training closes with a half-hour review and a written examination, complete with mathematical calculations. The review and examination help in two ways: First, they enable the trainer to critique his own instruction by seeing how well the soldiers retained the information. Second, they identify the soldiers who show the most interest in demolitions and who have a knack for math. These are the soldiers who should be selected for the unit's demolition teams.

Those teams should consist of two soldiers per squad, and these soldiers should be identified before the range training begins. Obviously, a soldier on a machinegun team or the unit's PIR (priority intelligence requirements) recorder would

not be good candidates. And the designated sniper would be too far from the objective to also serve as a demolitions man. In any case, the platoon leaders should make the final decision.

(For cross training, the soldiers should be rotated on and off the demolition teams annually. Or, if the training resources are available, entirely new crews can be trained. In a COHORT unit, though, it is more efficient to train demolition teams initially and keep them throughout their enlistment tour.)

Up to this point, the soldiers have been taught everything they need to know about demolitions to operate safely on the range. The next block of instruction should outline the training schedule on the range for the next three days. Then there will be fewer questions and less confusion when the soldiers go to the range.

On the range, trainers must assume, though, that nobody has any demolitions experience, and start with the basics. After an initial orientation, the soldiers should be required to prepare a nonelectric firing system, an electric firing system, and a dual combination firing system. This gives each soldier an opportunity to prime three blocks of explosive and tie them into a firing system. The designated demolition teams should be retained and the rest of the company released for other training until Day 5.

During the next day and a half the demolition teams are trained on specific charges. Although many of these charges are not directly available to the infantry, the soldiers will probably see them in combat and need to be familiar with them—for example, charges such as the 15-pound and 40-pound shaped charges, cratering charges, bangalores, and prefabricated satchel charges. Also an M-21 antitank mine should be primed nonelectrically in the booster well on its under side, placed under a junked vehicle—without the fuse—and detonated to demonstrate its blast effect.

Light infantry units are not authorized many of these materials for training, but a supporting engineer unit may be able to lend the infantry unit one of each type in a joint training venture. (The engineers at Schofield Barracks detonate these munitions quite frequently and are happy to let infantry units send a few men over to train with them.) The engineers will not always be able to support the infantry unit's specific training schedule, but they can help a great deal, and a close working relationship should be established with them.

In cases where an actual munition cannot be detonated, the charge can be constructed by field expedient methods to show its effects. (Appendix C of FM 5-25 shows how to make a field expedient shaped charge.) For instance, a field expedient bangalore can be demonstrated by placing TNT blocks end-to-end with U-shaped pickets taped around them. If U-shaped pickets are not available, bamboo poles or broomsticks will do—anything to hold the TNT blocks stiff. If even improvising is difficult for a particular munition, a class on it can be presented and a diagram of it shown.

The soldiers should also be shown how to construct small two-pound satchel charges for the demolition teams to use. Two blocks of C-4 are broken in half and then taped together. The charge can easily be carried in an M60 or M245 machinegun bandoleer.

The demolition team members should be allowed to calculate and place abatis and concrete-breaching charges so they can see the results of their own calculations. They should not be given too much leeway, though, during this calculation exercise. Competition can cause the sizes of the charges to get out of hand with no regard for economy of explosives or for the target.

The fourth day ends with the construction of a demolition ambush and a ditch charge. Then the demolition teams are reunited with the rest of the company for the live fire exercise on the next day, which takes six hours—two for each platoon.

The platoons move into assembly areas behind the ready line of the range and immediately assume tactical postures. All ammunition is issued immediately so the platoons can prepare their charges during the troop leading procedures. Then the operations order for a raid or an ambush is issued.

The commander walks the platoons through the course before the actual live fire exercise takes place. For a raid, the scenario should require that the soldiers remain undetected until they are right up on an enemy position so they can move up within 35 yards of it to place out a daisy chain of claymores. They then back away to the safety of a berm.

If range control procedures allow it, the platoon initiates

SAMPLE ORDER OF DEMOLITIONS AND EXPLOSIVES

1 box electric blasting caps (6 each)
150 nonelectric caps
4,000 feet detonator cord
1 case dynamite
4 cases C-4
1 case 1-pound blocks of TNT
300 ¼-pound blocks of TNT
16 claymore mines
2,000 feet time fuse
2 prefabricated satchel charges
1 15-pound shaped charge
1 40-pound shaped charge
1 40-pound crater charge
1 bangalore torpedo
75 M-60 fuse lighters
1 basic load 7.62mm, 5.56mm, 40mm, and grenades for each platoon
1 extra box fragmentation grenades
5 nonelectric demolition kits
1 electric demolition kit
8 number 10 cans
20 pounds of nails, nuts, bolts, and rocks
20 rags
20 pounds 16-penny nails
5 rolls electrical tape
1 roll communication wire, unspliced
25 cardboard silhouette targets
2 telephone poles, destructible timber
1 slab of concrete or masonry wall
Scrap lumber (preferably plywood and 90 2x4s)

Note: Actual amounts of materials depend upon the number of soldiers being trained.

Table 2

the raid with the claymores as the soldiers lob hand grenades and fire M203 grenades on the objective. When the platoon opens up with machinegun fire on the target, the breach teams conduct a hasty minefield breach with a grappling hook or entrenching tool and rope, and move toward the barrier wire. The breaching team then blasts through the concertina wire barrier with a bangalore torpedo.

For safety reasons, the wire barrier should be simulated, perhaps with engineer tape, because the wire can be blasted into so many missiles that they become hazardous. Later, when the unit becomes highly proficient with live fire exercises, the bangalore can be placed in actual wire, provided range control allows it and the soldiers keep their heads down.

This bangalore detonation signals the support unit to shift fires. When it does, the assault element sweeps through the objective and conducts its actions according to standing operating procedures. All three squad demolition teams get an opportunity to train as each squad places separate charges on the same objective. (Leaders should try to have something on the objective for the demolition teams to gather and place their charges on—such as scrap lumber, steel, or old tires.) The platoon leader, by tactically supervising his primary demolition team, rehearses his own actions on the objective. And range safety officers or noncommissioned officers monitor each of the three demolition teams for safety.

Another ambush is conducted in a similar fashion, but with a wire breach substituted for the demolition ambush and ditch charge.

Fragmentation grenades may not be safe to use in the demolition ambush, depending on the configuration of the range and the experience and confidence of the soldiers, and the indirect fire rounds must not be fired without overhead cover. Some commanders may also want to skip having their soldiers throw live grenades.

The ditch charge can be simulated with four lengths of detonating cord taped together without the nails taped to it. The chief instructor or range safety officer must always check the length of the time fuse that the students have calculated and cut.

The refresher training conducted six months later is only an abbreviated version of this initial training. The classroom training should open with a pre-test to determine how much the soldiers have retained. After all the soldiers receive hands-on refresher training with inert demolitions, most of the company can be released for other training and only the demolition teams retained for calculation exercises.

The next day, on the range, to familiarize the company with demolitions, each soldier in the company is given a single charge to prime. Then, for the rest of the day only the demolition teams are put through some adventure training and allowed to experiment with calculations. This is a treat for the teams, and it builds their confidence with the explosives they must use.

The final day, of course, should be a live fire exercise, with the two scenarios rotated between an ambush and a raid. A raid on an urban objective will require the breach teams to perform calculations for a concrete-breaching charge placed center of mass at waist level and vertically to facilitate ease of passage. If the company feels confident with explosives, a night live fire version might also be tried.

This demolition training program places priorities on the demolition skills that are critical to a light infantry unit. It teaches the basics. But it is just a guideline. Each commander needs to tailor it according to his available resources and range requirements. Used properly, it will make the most of those resources and teach infantry soldiers what they need to know about demolitions.

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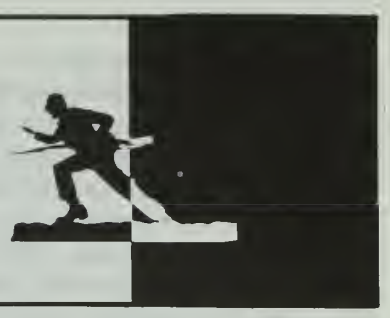
TRAINING NOTES



Roadmarching and Performance

LIEUTENANT COLONEL JOHN S. O'CONNOR
MICHAEL S. BAHRKE
CAPTAIN JOSEPH KNAPIK
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EDITOR'S NOTE: This final article in a series of three provides information gained from a study of the factors that are most important in determining road marching performance. The first article, "The Soldier's Load: Planning Smart" (INFANTRY, January-February 1990, pages 8-11), offers guidance on the various factors a commander must consider when planning the operational loads his soldiers will carry. The second, "Load Carrying Ability Through Physical Fitness Training" (INFANTRY, March-April 1990, pages 33-36), details a physical training program designed to improve our soldiers' ability to carry loads on road marches.

For centuries, commanders have been concerned about their soldiers' ability to march with heavy loads, and over those centuries a soldier's load has increased about three-fold. Fortunately, though, the distances a soldier has to cover today are relatively short when compared to the long marches of ancient times.

While current technology permits soldiers to transport larger burdens on the battlefield, two road marching realities remain unchanged: First, carrying a heavy load is physically and mentally exhausting; and second, it often results in injuries that can limit a soldier's ability to perform his mission. Commanders must be aware of these facts and take steps to reduce their negative effects as much as possible.

Not much is known about the way road marching with heavy loads affects the basic task performance of soldiers. As is often the case, in the absence of such information, many commanders overestimate their soldiers' ability to march with heavy loads and still perform mission tasks. They base their estimates upon pride and the unquantifiable "toughness factor" that all commanders tend to see in their men. Unfortunately, when it comes to strenuous road marches, this kind of confidence is misplaced, and it often sets the stage for mission failure. The physiological realities of fatigue do affect performance, and a commander can seldom overcome those effects by a mere desire to do so.

The soldiers of the 2d Battalion, 17th Infantry, 6th Infantry Division (Light), recently participated in a study to determine the physiological and psychological effects of marching with a heavy load.

The soldiers were required to carry 75 pounds in their rucksacks (the unit's winter tactical load) over 20 kilometers in the shortest possible time. They marched in BDUs (battle dress uniforms), Kevlar helmets, and boots of their own choice, and they carried the standard load carrying equipment with protective masks and their M16 rifles. The total weight of each man's equipment averaged 103 pounds (46 kilograms).

The march route consisted of open roads (paved, gravel, and dirt). Three-fourths of the route was flat while the rest was moderately hilly. The weather conditions were excellent with a partly cloudy sky and a temperature of 44 degrees Fahrenheit. Each soldier was instructed to complete the march individually and as quickly as possible.

The soldiers who participated were experienced infantrymen who were well-trained and highly fit. They averaged 21 years of age, 169 pounds, 69 inches tall, and 16 percent body fat. Their scores on the Army Physical Fitness Test averaged 55 push-ups, 67 sit-ups, and a time of

13:18 for the two-mile run.

Nevertheless, it became readily apparent after the first hour of marching under such a heavy load that the soldiers were fatigued and that, despite constant urging from their leaders (who also marched with the same loads), they were finding it difficult to focus on the mission. They took frequent rest stops after the first hour, and the number and length of the stops increased as time went on.

The average finish time for the soldiers was 5 hours and 24 minutes, an average of 2.4 miles per hour, which is considered good under the circumstances. Of the 335 soldiers who began the march, 323 (96 percent) marched the entire distance. (Less fit troops with less competent leaders would not have performed as well.)

Immediately following the march, within a 30-minute period, the researchers collected performance data on the soldiers for weapon firing accuracy, arm power, and leg power. Weapon firing accuracy was determined by target hits and distance from center of mass, arm power by a grenade throw for distance from a kneeling position, and leg power by vertical jump height. These figures were then compared to the soldiers' baseline performance on these same tasks under rested conditions, which had been collected one to three days before the march.

The data collected on weapon firing accuracy revealed a 25 percent decrease in the soldiers' ability to hit a stationary target at 25 meters and a 33 percent decline in accuracy (distance from target center) following the march.

The soldiers also showed a significant decline in arm power: The distance they could throw a grenade declined an average of three meters per man (10 percent) from pre-march performance. Surprisingly, there was no major change in leg power as determined by the vertical jump. (The results of the performance tests conducted after the march compared with those obtained before the march are shown in the table.)

There are several explanations for the erosion of marksmanship skills after the road march, most of them physiological—trembling as a result of muscle fatigue, elevated heart rate, decreased strength, and the like. Since the time between the completion of the march and the weapon firing was less than 10 minutes, the soldiers had little time to recover physically from their strenuous effort.

MENTAL STATE

In addition, the members of the research team collected psychological and injury (number and type) data after the march and compared it to information they had collected before the march. This data revealed a significant decline in psychic vigor and an increase in mental fatigue.

Research studies have suggested that such changes in mental state can also affect physical performance, especially in technical skills. In this particular situation, the change in the mood of the soldiers was probably equally important in the marksmanship decline—they were simply too mentally fatigued to concentrate on shooting well.

Although the injuries that resulted from the march were minor, 81 (24 percent) of the 323 soldiers who completed the entire 20-kilometer march were found to have some type of physical ailment that impaired their physical abilities to some degree and required medical attention. As a result of the march, 13 soldiers (4 percent) were issued profiles for a total of 44 lost or limited-duty days.

While these statistics in and of themselves are acceptable, the vast majority of the battalion's soldiers would have been hard-pressed to engage a hostile enemy in battle or to repeat a similar march the following day.

Blisters were the most common injury. Although the soldiers had been forewarned to take care of their feet, had marched with "broken in" footgear, and had received constant leadership attention during the march, 69 percent of them developed blisters as a direct result of this single march. This is somewhat surprising since all of the participants were light infantry soldiers, experienced at road marching, and in excellent physical condition.

The high percentage of blisters was most likely due to the heavy weight the soldiers carried and the speed at which they moved. (The sweating of the feet softens the skin, the friction of the soft skin inside the boot causes the layers of skin to separate, and fluid then fills the space between the layers, producing the blister.) Although blisters are only a minor medical concern, they do affect a unit's mobility for days after they occur and, in this case, would have incapacitated the battalion as a footmobile fighting force.

The results of this study indicated, then, that injuries will occur even in the most seasoned troops as a result of a single road march with a heavy load. Further, while most injuries related to this kind of road march will not immediately incapacitate a unit, they can reduce its combat effectiveness and limit its mobility for a considerable time following the march. And these are factors that commanders must consider both in their immediate operational planning and in estimating the effects a single road march with a heavy load will have on future operations.

Commanders can take two basic approaches to reduce the fatigue and injury associated with loaded road marching:

PERFORMANCE TEST COMPARISONS

	PRE-MARCH	POST-MARCH	% CHANGE
MARKSMANSHIP			
Hits (out of 10)	7.3	5.5	−24.7
Distance from center of mass	28.4	37.7	+32.7
HAND GRENADE THROW			
Distance (meters)	28.0	25.1	−10.4
VERTICAL JUMP			
Height (centimeters)	45.0	44.5	− 1.1

First, they can plan each road march wisely. This involves reading the battlefield with respect to mission, enemy, troops, terrain, and time (METT-T). Once they understand what must be done and what is involved in doing it, they can factor load, distance, and speed considerations into the mission equation.

Second, they can train their soldiers properly for road marching with heavy loads over long distances. Properly trained soldiers will be less fatigued, will perform their critical tasks better, and will suffer fewer injuries in the process.

Smart training for road marching with loads entails both general conditioning and road march training. A program such as the one described in the second article in this series (INFANTRY, March-April 1990, pages 33-36) can be used as a starting point and adapted as needed.

The most significant physiological factor associated with loaded road marching is muscle mass, which is related to strength. Generally, the more muscle a man has, the stronger he is and the better able to road march. Units that anticipate frequent road marching as a result of their mission should make strength training (building muscle mass) a major part of their physical training program. It is recommended that light infantry units conduct intensive strength training activities at least two or three times each week.

Cardiovascular fitness is also important for both endurance and recovery, and several sessions each week should be devoted to its improvement.

Flexibility, another important component of general physical fitness, should be part of any physical training program designed to improve load carrying ability. Soldiers with good flexibility have fewer low-back problems and may be less susceptible to musculoskeletal injury. The key here is to have a balanced PT program that will condition soldiers when they are not road marching.

In addition, the exercise principle of specificity suggests that the best way to improve performance on a task is to perform the task itself, and road marching is no exception. Research indicates that units with solid all-round physical conditioning programs can maintain their road marching proficiency by marching only twice a month.

Units that go overboard in conducting road marches with loads quickly reach a point of diminishing return when injury rates increase without a corresponding increase in road marching ability. And commanders who demand that their soldiers conduct "rucksack runs" only demonstrate their lack of knowledge about physical training and their disregard for the physical well-being of their soldiers. The constant jarring of rucksack runs stresses the body, especially the lower limbs, frequently leading to stress fractures and joint instability. Rucksack runs are not smart training for improving road marching ability.

Proper road march training should be just that—road march training—not a demonstration of physical toughness. A unit that requires quarterly road marches of 12 to 25 miles, for example, can verify that it is capable of a one-time movement. But these marches, without a sound PT program and frequent road marching to support it, become merely evaluations and often do more harm than good.

Road marching should not be scheduled more than once a week, even in the most foot-bound units. A wise program of road marching with loads should concentrate on developing marching endurance while at the same time keeping the decrement in mission skills to a minimum. Such a program should concentrate on short marches of four to six miles that end with the soldiers performing mission-critical skills. As the soldiers adapt to the training, the load and the speed can be increased and varied.

A realistic goal for road marching with loads in light infantry units is to work up to carrying 45 percent of body weight 10 miles in four hours. At the end of a march, the soldiers should be able to perform critical soldier skills to Skill Qualification Test standards. Such a program will enable a unit to increase its mission capability with little risk of injury.

The key to success for missions that require road marches with loads is simple: Have the soldiers carry the lightest possible load for the shortest possible distance, especially when enemy engagement is probable.

A commander must base his load plans on METT-T and must allow enough time following any road march for the soldiers to regain their strength and replenish their mental and physical energy reserves before going into combat. Recovery time after road marching should be at least one-third of the time spent marching. Failure to plan for this recovery period only sets the stage for possible mission failure.

Finally, and perhaps most important in lessening the negative effects of road marches with loads, is the quality of the training that will prepare soldiers to carry the loads they will need to move on the modern battlefield.

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Training Strategy and Safety

EDITOR'S NOTE: This article was written by an officer who served in the 1st Battalion, 507th Infantry, for a short time while waiting to attend another school and whose name, unfortunately, is not known.

In today's Army, we train hard to meet tomorrow's challenges. To be effective, training must be organized and conducted safely, and no unit is too small or too large to benefit from a good safety program.

Although many soldiers and leaders have trouble believing that realistic training and safety can coexist, there is a middle ground where the benefits from training and safety balance each other. This middle ground is what every unit must seek.

Incorporating safety initiatives into a training program is neither difficult nor overly time consuming. In fact, some units have achieved substantial results just by being more safety conscious. One such unit is the 1st Battalion, 507th Infantry, which is responsible for the training conducted in the Basic Airborne Course at Fort Benning. By instituting well-thought-out safety measures, the battalion dramatically reduced the number of parachute training accidents and injuries in the course.

A unit's safety efforts, like its training program, must be organized and coordinated, and any changes in procedure must be made carefully. A decision made in haste without the possible consequences being weighed can often result in even more accidents or injuries.

When the leaders of the battalion looked at improving safety in the course, they did what every unit must do—they first identified some specific problem areas. From a review of past records, it became clear that there were several areas in which changes in safety procedure could be made.

At the outset, for example, the leaders of the battalion knew that they would have to put command emphasis on improving safety and that initially there would be resistance to changes in training. To overcome this natural resistance, the battalion took a direct course of action. They let company commanders, platoon sergeants, and squad leaders know that they would be held accountable for injuries and attrition.

Then, when injuries or accidents did occur, two questions were asked: Did the trainers and leaders identify all the risk factors before the injury occurred? Were the trainers conducting training to the standards? If the answer to either question was "no," then further investigation was warranted.

COMMAND EMPHASIS

By letting leaders and trainers know that preventable accidents and injuries would not be tolerated, the command sent an important message. Subordinate units came to realize the importance of safety, and the command made better safety a personal goal for every leader in the battalion.

One safety measure that is closely related to accountability is that of identifying the students who are highly susceptible to certain types of injury. These high-risk students fall into two basic categories—those who are more susceptible to heat and cold injuries and those who are more susceptible to head injuries.

The procedures for identifying the students in each category are basically the same: When students first enter the course, medical personnel at the Troop Medical Clinic screen their records looking for any signs of previous heat, cold, or head injuries. The students' leaders also question them as to whether they have had any of these problems.

Any students who are identified as high risk are marked (their uniforms are tagged) so that all the leaders and trainers can tell at a glance which soldiers they must watch more closely during training.

An important part of the training that students receive in the course is performing proper parachute landing falls (PLFs), and some of this training is conducted on the swing landing trainer (SLT). The trainer allows students to descend from a 12-foot high platform. During the descent, they are subjected to a motion similar to that of a parachute descent. At a certain predetermined point, the student is released and is expected to perform a correct PLF.

To improve the safety at the SLT site itself, several simple and easily implemented changes were made. One was to increase the height of the retaining wall around the SLT pit so the pit could hold more sawdust and make the landings softer. A second change was to lower, by one and one-half feet, the student release marker indicators—the point at which the trainers release the students from the training apparatus and the students fall to the ground. With a shorter distance to fall, the students have less potential for injuries while they are still learning to perform PLFs.

In addition, a medical study was made to investigate the SLT's physiologic effect on the students. Although that research is still in progress, it is expected that the results will suggest ways to im-

prove SLT safety further in the future.

Of all the training in the course, none is more potentially dangerous than the actual jumps from an airplane. The battalion found several areas where changes could be made in its jump procedures, and a safety film was produced that all students see on the day of their first qualifying jump. The film—essentially a complete review of the first two weeks of training—thoroughly discusses jump procedures, control of the parachute, PLFs, and emergency procedures.

The battalion leaders saw room for improvement in the parachute jump sequence for students. Basically, all the students jumped twice with the T-10 parachute, then once with the MC1-1, then twice more with the T-10. Because the two parachutes differ in their maneuverability and landing characteristics, this sequence forced the students to change their procedures halfway through and then return again to the original procedures. The jump sequence was modified so that the students now use the MC1-1 on their last jump. This allows them to concentrate on T-10 procedures for the first four jumps and then on MC1-1 procedures.

Another change was to reduce the number of jumpers who exited through each door, during one pass over the drop zone, from 15 to 10. This reduction has helped reduce the possibility that parachutes will become entangled.

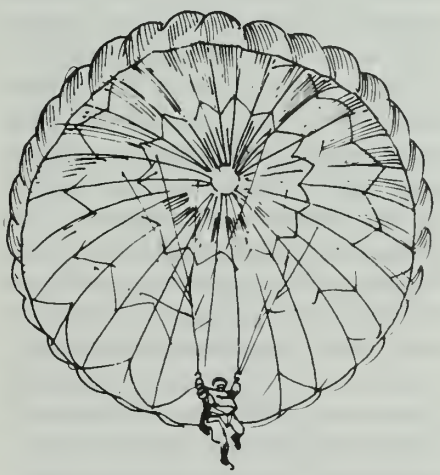
Although the long, wide open drop zone used for the course was about as safe as a DZ can be, several small changes made it even safer.

First, the portion of the zone where 80 percent of the jumpers landed was plowed to make the landings somewhat softer and prevent lower leg injuries. (These injuries are the most frequent type of recordable injury—those requiring that an accident report be prepared in accordance with Army Regulation 385-40).

Then the battalion began spreading ten qualified cadre coaches, with bullhorns, throughout the drop zone for every jump. These ten coaches—one for every two jumpers—are there to correct and advise jumpers as they are landing. To ensure that they are heard, the speaker system used is capable of reaching 1,250 feet into the air (the jump altitude). This method has proved effective in reducing PLF-related injuries.

The use of smoke on the DZ was expanded, depending upon wind conditions, to enable the jumpers to see the wind direction. Both types of parachutes require a jumper to perform certain steering procedures that slow his horizontal movement across the DZ, and he must know the wind direction to perform the correct procedures. The battalion increased the requirement for smoke from one location to two for all jumps. This change has also helped reduce PLF-related injuries.

Several other measures have been taken. One particularly important one was to ask the Infantry School's Directorate of Combat Developments to conduct a study that would lead to improvements in the Kevlar helmet or to a design for an improved concussion helmet. One area being explored is a possible correlation between neck size and strength and how this might relate to head injury. If such a correlation is found, a predetermined neck size or strength may become a prerequisite for the Basic Airborne Course.



While physiological data is being gathered, possible changes in the paratroopers' equipment are also being considered. Future projects may include the development of a foam or air-filled insert for the Kevlar helmet. Some of the factors that must be considered are ballistic protection versus head crash protection; full time protection versus jump-only protection; and the size and weight of the helmet.

Another innovative measure was to use the full potential of such students as enlisted medics, doctors, and chaplains. These students are now identified when they start the training and are informed that, even in a training environment, they are still responsible for using their skills to help other students, if the situation dictates it. Primarily, the medics and doctors are to spot injuries during daily training, and the chaplains are to counsel any fellow students who may need their assistance.

The goal of instituting all of these new safety procedures was to reduce accidents and injuries as much as possible without reducing the realism of the training. The battalion leaders realized, however, that they would not be able to eliminate all accidents and injuries. Now, though, whenever a major injury does occur, a battalion safety meeting is convened. Anyone who is even remotely involved in the training accident—parachute riggers, jumpmasters, other jumpers, the chain of command, and all company commanders—get together for a thorough investigation to identify the causes and effects of the accident. If possible, they also identify measures that may prevent further accidents of the same type, and these measures are immediately implemented.

After a new safety initiative has been in effect for more than a year, the accident and injury records are reviewed and compared with those of previous years. When recordable jump injuries from Fiscal Year (FY) 1989, the first year with new safety initiatives, were compared with the injuries for FY 1988 and FY 1987, the results showed that safety had improved immensely. In fact, injury rates had dropped from 1.26 per thousand jumps in FY 87 and 1.02 per thousand in FY 88 to 0.56 per thousand in FY 89. In short, the safety initiatives worked better than anyone had imagined they would.

As a result, the 1st Battalion, 507th Infantry is now helping other units improve their safety records. The battalion

is producing an exportable safety film, for example, that will help airborne units conduct safer airborne operations.

These safety measures are only a few examples of the way a unit can improve its safety record. No matter what type of training a unit may conduct, there is always room for improvement. All it takes is some common sense, a little imagination, and the will to succeed. By identifying problem areas, developing solutions, and emphasizing those solutions, a unit can see results. Those results may not be dramatic, but where safety is concerned any improvement at all is worth the effort.

Kangaroo 89
U.S. Light Infantry in the Outback

LIEUTENANT COLONEL COLE C. KINGSEED

The mission of a light infantry force is to deploy rapidly to defeat enemy forces in a low intensity conflict and, when properly augmented, also to fight and win in a mid or high intensity conflict. No exercise has demonstrated the ability of a light force to accomplish its low intensity mission more clearly than during Kangaroo 89, the largest peacetime military exercise in Australia since World War II.

This joint combined exercise, set in northern Australia, involved more than 20,000 men and women from the Australian Army, Navy, and Air Force, as well as a light infantry task force from the 25th U.S. Infantry Division (Light). This light infantry task force formed the nucleus of more than 1,800 members of the United States armed forces who took part.

In addition to the inherent value of the exercise to Australia's Defense Force, Kangaroo 89 also served to further validate the U.S. light infantry division concept. Not only was the U.S. task force able to deploy rapidly to Australia's Northern Territory, but it also conducted low intensity operations for a sustained period in one of the world's harshest climates and on some of its harshest terrain.

The U.S. task force had unrivaled success in the Australian outback and learned many lessons that may benefit the rest of the light infantry community.

What the Australians call "low level" conflict bears striking similarities to our own concept of "low intensity" conflict. As defined in their doctrinal literature, "low level" conflict is that in which an opponent engages in politically motivated hostile acts ranging from non-violent infringements of Australia's sovereignty or interests to small-scale military actions against the country.

This level of conflict may arise with little or no warning and may not require direct military involvement. It includes operations against small scale air intrusions, harassment of local shipping, and limited harassment and raids by small groups.

Australian doctrine also includes "escalated low level" conflict, which is the upper limit of the way existing and prospective regional military capabilities might realistically be applied against the nation.

Essentially, in escalated low level conflict, an enemy supplements (or substitutes) unconventional tactics and forces with military units that are prepared to confront conventional forces directly. Such confrontation could include increased aerial or naval harassment, attacks on Northern Territory settlements and installations, and more intensive raids by land forces.

During Kangaroo 89, the spectrum of conflict rapidly moved from low level to escalated low level conflict. To counter an incursion from a mythical island nation, Australia deployed its 1st Division, its only active duty division, to the northern rim of the continent. Attached to the division's operational deployment force was the light infantry task force from the 25th Infantry Division. It consisted of the 4th Battalion, 87th Infantry, a 155-man howitzer battery, a company of UH60 Black Hawk helicopters, an Engineer platoon, a detachment from the division's Military Intelligence battalion (consisting of the long range surveillance detachment, a low-level voice intercept team, and a section of AN/TRQ-32s), a Stinger section, and a combat service support element.

Also included in the task force package were 18 key personnel upgrade program (KPUP) controllers and a civil affairs team from the 25th Division's CAPSTONE unit, the 445th Civil Affairs Company from California. Of special

note was the fact that the 4th Battalion, 87th Infantry was a fairly new COHORT unit with only four months on station in Hawaii at the time of deployment.

During the exercise, the units conducted sustained low level operations over extended distances for four consecutive weeks. The Australian division's units traversed an area of operations that spanned 3,000 kilometers, and the U.S. task force typically was assigned an area of operations 90 kilometers square. Such a vast area presented a light infantry battalion with an entirely new series of challenges.

During the course of the month-long exercise, the U.S. task force conducted most of the missions in its tactical mission essential task list (METL) in a low intensity environment. The offensive missions included search and attack, air assault, deliberate attack, hasty attack, raid, and movement to contact. The defensive operations included defense in sector and defense from a battle position. In addition, the task force conducted sustainment operations, including the treatment and evacuation of casualties and aerial and ground resupply.

The extensive after action review that the leaders and soldiers conducted throughout the field training exercise helped me immensely in preparing the comments that follow. These comments are offered as observations, suggestions, or recommendations for future operations. Discussing them in the context of the battlefield operating systems will help convey an appreciation of the way this particular light task force succeeded in such a grueling environment.

Command and Control. We soon realized that long range communication systems were absolutely necessary. Although the homogeneity of the terrain facilitated direct FM communications over more than 70 kilometers with a single relay station, we needed improved high frequency radios, particularly to communicate with the Australian brigade headquarters to which the task force was attached. An Australian radio team that accompanied the task force throughout the tactical phase did improve interoperability.

As might be expected, the exercise was

not without its share of flaws. The operators of all long range communication systems had to be trained extensively. Our improved high frequency radios (IHFR) were not fully effective because of their large radio frequency signature and the inordinate amount of power they required. Moreover, we had to spend some time to make sure that all of the systems were compatible during both the predeployment and deployment phases.

The area of operations itself dictated that the battalion decentralize most of its operations. As commanders operated within the conceptual framework of the task force commander's intent, this decentralization resulted in immediate success on the battlefield.

Interoperability with the Australian brigade headquarters proved no obstacle, because the leaders had exchanged and discussed standing operating procedures, operational and logistical reports, and requests for support before the tactical exercise began. The compatibility of equipment and the similarity of tactical language also eased the process.

Maneuver. This to us was the most striking feature of the exercise, because the long distances over which we operated and the ever-changing counterinsurgency scenario promoted improvised tactics. To ensure that the task force could react quickly and decisively to enemy sightings, we placed an immediate reaction platoon on strip alert with five minutes notice. A rifle company (minus) was prepared to augment this platoon on 30 minutes notification, and the brigade commander placed three UH60 aircraft under the operational control of the battalion task force commanders.

The wisdom of such an arrangement became immediately evident as the task force twice dispatched the company to destroy enemy platoon-sized forces on the fringe of the operational area, a distance of more than 70 kilometers. In both cases, the company commander received his operations order from the S-3 while in the aircraft on the way to the objective. In both operations, the availability of the immediate reaction force with aerial assets resulted in the complete destruction of the enemy force.

Other aspects of maneuver greatly contributed to the light infantry's success in taking the war directly to the enemy. TOW vehicles with squad automatic weapons, for example, and Military Police units performing their secondary roles of surveillance and security gave the task force mobility and firepower that it greatly needed.

The use of such technology as UH60 and OH58 helicopters, squad automatic weapons, night observation devices, the platoon early warning system, AN/TRQ-32s, tactical satellites, the positioning and azimuth determining system (PADS), and Engineer small emplacement excavators (SEEs) not only validated the technology-based light division concept, but also gave the infantry a distinct advantage over the opposing force it was facing.

The technology that most impressed the Australians was the task force's night vision capability. Not only were they amazed at our ability to conduct night

operations successfully, they also were surprised at the number of devices available in a light infantry battalion. Frequently, the UH60-mounted TOW sights and AN/PVS-7 night vision goggles identified insurgent teams at great distances and gave commanders timely intelligence to use in rapidly repositioning their forces to intercept and destroy the threat.

The maneuver lessons learned included the need to rehearse all immediate reaction force operations and to use the available light division technology to the utmost. Light infantry works and succeeds best during periods of limited visibility, when technology and the soldiers' stamina can make a difference.

Fire Support. Closely related to the maneuver lessons were certain important fire support lessons. Including the 155mm artillery battery in the task force paid dividends because of the vast area of operations. Unfortunately, the only Australian Chinook squadron had been decommissioned in the previous month, so there were no medium lift helicopters to transport the artillery battery and it had to move by roads or trails. Nevertheless, judicious planning by the battery commander, who frequently operated in a split configuration, gave us artillery coverage throughout the entire area of tactical operations.

To offset the lack of mobile artillery support, the battalion attached an 81mm mortar section to the immediate reaction force. This gave that force additional indirect fire support when it deployed away from the normal area of operations.

Intelligence. The most spectacular achievements of the task force resulted from its intelligence-gathering capabilities. We used all of our collection assets to the fullest. Good intelligence preparation of the battlefield, such as analyzing water resupply routes, aided in initially locating the bulk of the enemy force. When low level voice intercept and AN/TRQ-32 teams located an enemy command post, ground troops immediately sealed off the objective area and eliminated enemy resistance under cover of darkness.

Again, the use of the TOW system with its available night sights enabled the force to maintain continual surveillance of the enemy. In addition, battalion scouts and the long range surveillance detachment operated at distances of 70 and 200 kilometers, respectively, from the tactical operation center. The establishment of forward area rearm/refuel points (FARPs) together with the use of aerial communications ensured that those soldiers were well supplied and could continue to provide immediate intelligence on enemy forces.

With respect to intelligence collection, our experience in Kangaroo 89 validated many of the lessons that had been learned by light battalions at the combat training centers. For example, commanders must teach their staffs how to collate the information that arrives in the TOC from numerous sources. A good IPB is also critical to success on the battlefield. By identifying tactical areas of interest (TAIs) and named areas of interest (NAIs), we were able to pre-position forces to act or react when needed. The long range surveillance detachment performed splendidly, but expanding it from four teams to six would have given the division commander a more valuable intelligence-gathering capability.

Air Defense. Since the exercise was based on low level conflict, the air defense threat was relatively low, and our Stinger teams were more than enough to counter any enemy threat.

Mobility, Countermobility, and Survivability. Engineer assets, on the other hand, played an integral role in the battalion's success. The inclusion of light sapper teams and two SEE vehicles gave it an edge in mobility and countermobility that became the envy of the Australians.

The Engineer platoon received some of the most realistic training of any unit in the task force. It constructed landing zones, roads, and a Caribou airstrip, and conducted numerous mine-clearing operations. The only problem the platoon encountered during the entire exercise was the fragility of the SEEs' tires. A total of five tires were blown during the month-long exercise.

Combat Service Support. Lastly, the combat service support (CSS) elements witnessed some major accomplishments. Attaching themselves to a foreign service support system was a remarkable achievement, and by coordinating their efforts with the Australian's support organization, these CSS elements were able to provide continuous support for the U.S. task force.

The light division's forward area support coordinator (FASCO) concept worked well in most cases, and the HMMWV (high mobility multipurpose wheeled vehicle) proved its reliability and versatility throughout the entire field problem. In addition, cross attaching mess teams helped in the preparation of meals.

Although the task force discovered that the authorized stockage list (ASL) that accompanied the battalion was inadequate, insisting that the commander approve the final ASL can remedy that problem in the future.

Kangaroo 89 clearly demonstrated the ability of light infantry forces to deploy rapidly and conduct coalition warfare. We made a number of valuable discoveries:

- Young COHORT soldiers can assimilate small unit tactics and build cohesion and teamwork through extended field operations.
- The use of technology can make a dramatic difference and can result in a disproportionate number of enemy casualties.
- The toughness and tenacity of light fighters over extended time and distance can ensure success on the low intensity battlefield.
- Offense-minded leaders and innovative tactics can carry the battle to the enemy and keep him off balance.
- Our units can adapt to the SOPs of other nations to improve interoperability and command and control.

Most important, Kangaroo 89 validated the light infantry division concept of deploying rapidly and fighting and winning in a low intensity conflict.

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Night Attack

LIEUTENANT COLONEL LYNN D. MOORE

During my tour as a battalion commander in the 82d Airborne Division, and during previous assignments as well, I witnessed countless night attacks both by my own units and by sister battalions. In almost every case—despite careful planning, rehearsals, and rigid control measures—there was chaos on the objective. Not only has this been my experience, but it also seems to be true of infantry units at the Joint Readiness Training Center (JRTC).

The attacks that ended in failure were characterized by the following:

- The misorientation of assault forces.
- The inability to tell friend from foe.
- Fratricide.
- Confusion when the target was not "as briefed."
- The loss of command and control.
- The failure to secure the entire objective.

It was obvious that we had to find a way to take an objective at night without killing ourselves. The technique we developed, called STARBURST, solves the problems endemic to the night attack by doing the following:

- Emphasizing stealth.
- Massing automatic weapons to support breaching operations (as in Rommel's *Attacks*).
- Task organizing down to fire team level.
- Controlling the direction of fire of all weapons.
- Requiring assault team leaders to designate team targets.
- Being independent of target description.
- Employing speed and violence of execution similar to SWAT room-clearing operations.

A STARBURST attack, as we do it, begins with the scout platoon's surveillance of the objective. Using both reconnaissance squads and snipers, the scouts make a thorough reconnaissance of the target with the primary aim of identifying the point in the defensive line where we will make our attack. We may determine this breach location by discovering a weakness in the defense or by using the best approach to the objective.

At the same time, the scouts identify an assault position 200 to 300 meters from the target and a linkup point at some greater distance where they will first meet the battalion and brief the leaders on what they have found.

To reduce the chance of compromise, we do not make a leaders' reconnaissance if the scouts have had enough time to get

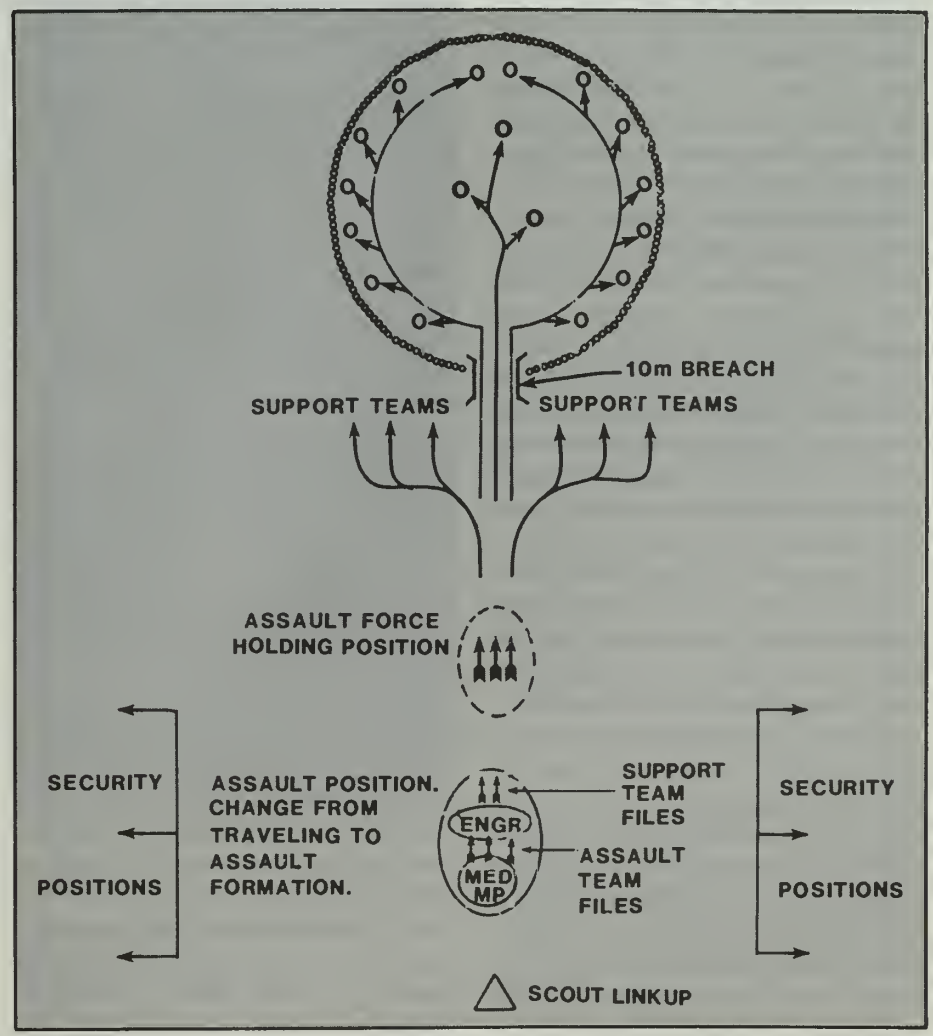

Figure 1

a clear picture of the target. Artillery harassing fire is used during the approach march to cover any noise and to get the enemy used to explosions on his perimeter in case our sappers have to make an explosive breach.

We plan preparatory fires but use them only if we cannot get close to the objective using stealth. Often, the close-in approach requires us to drive the enemy observation posts and listening posts back inside their perimeter, but out first choice is always to bypass and let the scouts take them out when the attack starts.

While the scouts are working, we organize the battalion in the assembly area into a support group and an assault group.

The support group is made up of two platoons from a line company. The first, augmented by four M60 machinegun teams from the assault group, serves as the point platoon in leading the battalion to and through the scout linkup point and into the assault position. Once in the assault position, the platoon splits into two sections to provide right and left flank security while the main body moves into the assault formation.

The second support platoon's mission is to provide suppressive fire during the breaching operation conducted by engineer sapper teams. Depending on the enemy's disposition at the selected breach point, this platoon will have as many as six support squads. Each of the squads has a squad leader, an M60 team (two more taken from the assault company), two M249 machineguns (SAWs), and an AT4 gunner.

This amount of firepower, concentrated on a narrow front on each side of the breach, ensures that we will be able to make the breach and move the assault elements through it relatively unopposed.

These fire support squads are positioned immediately to the left and right of a breach area approximately ten meters wide. They move into an overwatch position—undetected if possible but prepared to fight their way into it if necessary—and suppress by fire any enemy soldiers who could jeopardize the actions at the breach point. The members of the support squads fire only if the attack is discovered and only for the time it takes to complete the breach and allow the assault force to enter the enemy's perimeter or his defensive line.

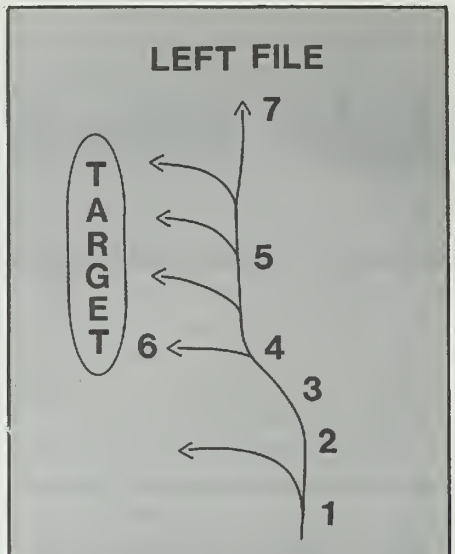

Figure 2

1. Last member of preceding team breaks left to go on line.
2. TL continues around perimeter as point man of the file. By now he has identified the previous team's marker and is scanning farther to the right to determine his own team's target.
3. TL identifies a target and uncases his marker. If he cannot identify a specific target, he chooses a point on the perimeter that, depending on the terrain, will allow maneuver room for the preceding team. He changes his direction of movement (and the file's) to close the distance to the target and, at the same time, readies his marker.
4. TL throws the marker and in the same motion goes into a prone firing position. As the team comes on line to his right, he provides suppressive fire, showing the left firing limit for the team, and announces the target location relative to the marker.
5. Other team members come on line, execute a right side combat roll (in the direction their momentum takes them) and begin firing in the area designated by the TL.
6. TL starts individual movement technique by doing a left combat roll to minimize the chance of masking his team's fire. After his rush, he does a right combat roll to stay out of the line of fire of the team he initially followed in. (Most teams should be on their target in their second rush.)
7. The remainder of the file continues around the perimeter.

Once their fires are masked by the assault force, the fire support squads shift their fires to a line outside the objective to keep the enemy from escaping from the position or reinforcing it. The assault units do not break cover until the enemy weapons firing on the breach site are suppressed and a relatively unopposed passage through the breach is insured.

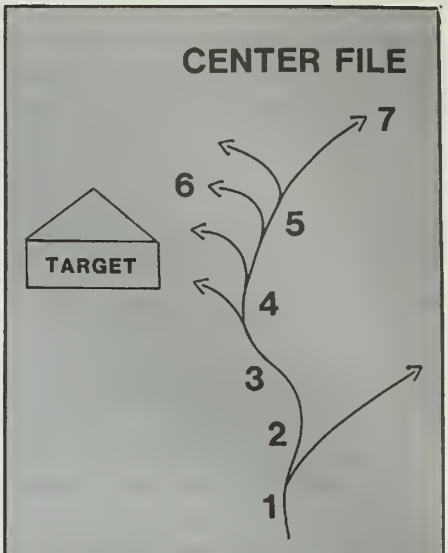

Figure 3

1-4. Same actions as the other files except that the targets should be softer and closer to the direction of assault.
5. Interior assault teams come on line in the same manner as the perimeter teams, with the shotguns in the middle and the pistol on the flank away from the TL. Because of the need to keep the interior assault ahead of the actions in the perimeter (to prevent perimeter teams from being hit by interior team fires), team members will go only to a kneeling position while the TL provides suppressive fire and target guidance.
6. As soon as the TL announces the target location relative to the marker he has thrown and the suppressive fire he is providing, the shotgun and pistol carrier assault the target.
7. The interior file continues.

The assault group, for a battalion size objective, has four rifle platoons organized into three- or four-man assault teams (maintaining fire team integrity as much as possible). The number of assault teams used is determined by the size of the defensive perimeter or line, or by the number of known or suspected enemy positions. The assault teams go through the breach in three closely spaced files, each of which is responsible for a specific portion of the perimeter.

The left file, facing in the direction of attack, takes the left side of the perimeter, the right file takes the right side, and the center file goes for the softer targets in

the center (see Figure 1).

One of the main purposes of this technique is to prevent fratricide; in other words, each assault team attacks away from the other teams inside the perimeter as well as away from the support squads that remain near the breach. To accomplish this, the assault teams must be given the responsibility for designating team targets, task organizing down to fire team level, and exercising strict fire control and maneuver rules.

RULES

The general fire control rules we set down for the assault teams are the following:

- Perimeter assault teams are armed with M16s or M203s. Interior or center assault teams have one M16 (team leader), two shotguns, and one 9mm pistol.
- The team leaders, and whenever possible the assistant team leaders as well, wear AN/PVS-7 night vision goggles during night operations.
- When visibility is limited, no one without night vision goggles may fire into the perimeter, and those with the goggles may fire only at a positively identified enemy soldier or unit that presents a clear threat to a team.
- Within the perimeter during the assault, only semi-automatic fire is allowed; any automatic weapons firing in the perimeter will therefore be the enemy's.
- No grenades, flares, or smoke are used in the assault.
- To mark his team's targets, each team leader uses chemical lights or, in daylight, weighted pieces of colored panels.
- Team leaders load 100-percent tracer rounds. Assault team members orient their assault and fires on the team's target marker and may not fire outside the limits defined by the tracers fired by the team leaders to their immediate right and left.
- To signal the teams to come on line and begin individual movement techniques (IMTs), the team leaders throw the target markers. Because speed is essential in the attack, leaders do not uncase and throw their markers until their teams are close enough to complete the assault with just one magazine of ammunition. (The assault should move too quickly to allow time for a magazine change.)

The teams then come on line and the left file assaults as shown in Figure 2, and the center file assaults as shown in Figure 3. The right file's assault mirrors that of the left file.

The assault company commander travels in the center file. He has enough teams in front of him to subdue all known or suspected enemy interior positions; he also has a number of assault teams following him to act as a reserve in case other assault teams need additional forces. Once the assault teams report that their portion of the perimeter is secure using their file and team number—"left 5 secure"—platoon leaders relay the reports to the assault company commander. Once the entire perimeter is secure, we have the option of reinforcing the position with automatic weapons from the support squads or, if the mission is to conduct a raid, of leaving them in place to cover our withdrawal.

On a final note, support such as Military Police and the aid station travel behind the assault element and are left in the assault position, secured by the support company's lead platoon, until they are called forward.

We have used STARBURST in raids and attacks (day and night), at platoon through battalion level (company level with MILES), with equally good results. And we have begun to find many other uses for the file techniques, such as military operations in urban terrain and building clearing when an assault force is difficult to control.

Some observers have been critical of the unit's vulnerability when it is packed into the assault formation. Most have to admit, though, that whatever tactic a unit chooses, being hit by artillery in an assault position will probably cause a change of plans.

The real value of STARBURST as a night attack technique was demonstrated in a night, non-illuminated, battalion live fire attack conducted as part of a division officer professional development program. The 100-meter diameter target had 14 perimeter positions and three interior defensive positions. The assault—from the explosive breach to the clearing of the final bunker—took 137 seconds. And nobody died.

Stealth and control lead to success.

Lieutenant Colonel Lynn D. Moore commands the 3d Battalion, 504th Infantry, 82d Airborne Division. A 1970 graduate of the United States Military Academy, he commanded a company in the 3d Battalion, 325th Infantry and served in Vietnam with a Ranger unit. He holds a master's degree from the University of Oklahoma.

Obstacle Integration
A Matter of Intent

CAPTAIN BRYAN G. WATSON

Throughout the Army, we continue to improve our ability to fight as a combined arms team. The integration of the mobility, countermobility, survivability operating system, however, remains below the mark. And nowhere is this more true than at battalion task force level.

Task forces continue to have difficulty integrating obstacles to support their defensive schemes of maneuver. Their obstacle plans are often developed piecemeal and without a thorough appreciation for the enemy's maneuver options within a sector. The engineer often develops his obstacle plan in isolation from the task force's maneuver planning process. And, since he lacks proper planning guidance from the commander or the S-3, his plans fail to synchronize the effects of the obstacles with the task force's fires and to focus on supporting the direct fire fight.

Company commanders are also issued the task force obstacle plan without a clearly defined link between obstacle effects and the direct fire fight. As a result, they often change the orientation, composition, or location of obstacles to better fit their idea of what their company needs without regard for the effect of the change on the task force's fight. These problems all stem from the lack of an established and clearly understood obstacle intent.

The success of a task force plan has always relied on actions at the company level; a task force commander synchronizes the company plans through his clearly understood intent and personal supervision. The same holds true for the obstacle plans generated at task force level. The task force commander is therefore responsible for establishing an obstacle intent. It provides continuity and unity of effort as the task force's obstacle plans are confirmed or adjusted by the company commanders and as the obstacles are integrated into the company's direct and indirect fire plans.

INTENT

When the tasks force's operations order is issued, the commander's maneuver intent is presented in the form of a stated scheme of maneuver, complete with direct fire control measures and maneuver graphics. The company commanders use these to position and orient their weapons so the direct fire effects achieved will be consistent with the task force commander's intent.

Likewise, the subordinate commanders are given the commander's fire support intent in the form of a stated scheme of fires (with a target list and overlay) that discusses the desired effects in terms of *suppress, neutralize,* or *destroy*. The company commander uses these to plan the execution of assigned fires as well as his own so the desired indirect fire effects can be achieved.

For the task force obstacle plan, however, a company commander is usually handed a target list and an overlay so he can sight in the obstacles and cover them with fires. Rarely is there any sort of discussion of the scheme of obstacle support to explain the effects the task force commander is trying to achieve with his tactical obstacles or the way these effects support the total task force fight.

The standard operations order (OPORD) paragraph titled "Obstacles, Mines, and Fortifications" is intended to describe the way the engineer's effort supports the task force fight. In practice, however, its sum content is usually "Engineer priority is to countermobility, survivability, and then mobility." This says nothing. And the company commander is never issued graphics that illustrate for him the way his fires and the obstacle effects combine to support the task force commander's intent.

The technique presented here will help task force commanders and their staffs plan obstacles to support a defense-in-sector mission. The focus of the technique is on the use of graphics to depict obstacle effects in developing an obstacle intent. These same graphics help the engineer develop an obstacle system design that is consistent with the overall intent.

Furthermore, the final product of this system, the scheme of obstacles overlay, gives the company commander graphics that illustrate both the obstacle plan and the obstacles' desired effects on enemy maneuver (the obstacle intent). This link between intent and plan is critical to the company commander's understanding of the way the obstacles will complement the direct fire fight. It also enables him to adjust obstacle locations, when the

need arises, in keeping with the task force commander's intent.

The Engineer School recently revitalized Field Manual 5-100, Engineer Combat Operations, and included some new doctrinal concepts and terms that a maneuver commander needs to understand.

Of particular importance is the manual's new treatment of obstacles within the framework of the defensive mobility, countermobility, and survivability operating system. Obstacles, in the traditional sense, are no longer purely in the category of countermobility. They are now subdivided into *tactical* and *protective* obstacles.

SUPPORTING

Although tactical obstacles have kept their place under the heading of countermobility, their focus is now more clearly defined as supporting the task force's direct fire fight. They are used to directly target enemy maneuver and "to support the tactical play by physically manipulating the enemy in a way that is critical to the commander's concept." Individual tactical obstacles and subsystems are designed to produce one of four specific effects on enemy maneuver: *Disrupt, turn, fix,* and *block.*

Protective obstacles, on the other hand, now fall under the category of survivability. By their nature, they have little effect upon enemy maneuver in a way that supports the task force's tactical fight. Their focus, rather, is on "providing a force [usually a company/team or smaller] with a combat edge during an enemy's final assault."

Protective obstacles are planned much like a unit's final protective fires (FPFs) and are certainly integrated into the FPFs. As with FPFs, a company commander is responsible for planning, siting, and emplacing his unit's protective obstacles. Although work assets and material resources may also be allocated for protective obstacles, tactical obstacles must be the primary focus of the engineer effort.

All members of the task force involved with the obstacle plan must understand the four functions of tactical obstacles and the effects they can expect to have on an enemy maneuver force:

Disrupt. These obstacles disrupt enemy march or pre-battle formations, break up timing, frustrate low level command and control, and try to exhaust the enemy's breaching assets early. They may be used to cut high speed routes and to strip wheeled support vehicles away from the main body. They are usually of small frontage, quick to emplace, easy to breach, and in sufficient depth to cause the necessary level of frustration.

Although these obstacles may or may not be covered by direct fire, they are always covered by observable indirect fire.

Turn. Turning obstacles move or manipulate an enemy formation to the task force's advantage. The turning effect is normally used in conjunction with a battle position's orientation. The key to a turning obstacle's effect is the degree of subtlety used to effect the turn. Thus, the obstacles should turn the enemy formation in small stages with easily detectable bypasses in the direction of the desired turn. Supporting fires should be used to complement the turn.

Turning obstacles must be tough to breach, and the fires must target any breach attempts to help protect the integrity of the obstacle.

Fix. Fixing obstacles slow the enemy within a specified area, with the aim of killing him by massed fires or by allowing friendly forces to disengage and reposition.

Fixing obstacles should be employed in enough depth to force the enemy to conduct repeated breaches throughout the range of the available supporting weapons. Fixing obstacles are most effective when used against deployed formations and therefore should not be used at the maximum range of the supporting weapons unless other weapons have already caused the attacker to deploy.

A fixing obstacle should not appear so hard to breach that the enemy diverts his forces elsewhere. Instead, it should allow him to continue his advance slowly until his attrition is complete.

Block. Although obstacles, by themselves, never completely block enemy maneuver forces, the combination of massed supporting fires and complex obstacles that are designed to defeat enemy breaching efforts can stop an attacker along a particular avenue of approach (or allow him to advance but only at an extremely high cost).

Blocking obstacles may be used to limit an enemy penetration or to set up a lucrative target area for a counterattack by fire. Blocking obstacles require a great deal of time and resources and by their nature must be tied in with restrictive terrain.

Nothing about the obstacle integration technique presented here is really new except for its total commitment to establishing an obstacle intent and its emphasis on developing both intent and plan within a framework of specific obstacle functions or effects. The intent then becomes the foundation for all engineer and maneuver coordination at both the task force and the company team levels. The intent must always be the focus, since it bonds the obstacle effort with the direct fire fight. It does use some unique graphics and a seven-step procedure to highlight obstacle planning considerations. In the end, an overlay is produced that illustrates both the obstacle intent and the obstacle plan.

BASIC STEPS

The seven basic steps are the following:

- Analyze the situational template and the maneuver graphics.
- Analyze the direct fire needs.
- Integrate the obstacle intent.
- Allocate the engineer efforts.
- Design the obstacles.
- Identify the mobility requirements.
- Prepare the scheme of obstacles overlay.

To make it easier to discuss obstacle integration, the maneuver course of action used from this point on is shown in Figure 1. The terrain is intentionally left out to simplify matters and to focus on the particular obstacle integration technique being presented.

First, although a maneuver plan has been adopted, the engineer's involvement

should begin earlier when the task force receives its warning order. That involvement should continue through the IPB process, the development and wargaming of maneuver courses of action, the integration of indirect fires, and so on.

Analyze the Situational Template and the Maneuver Graphics. Too many maneuver plans are developed without a thorough appreciation for the avenues of approach and the mobility corridors that run through the sector.

Figure 2 shows an example situational template compared against the maneuver graphics. The S-2's template should identify the points where the enemy is capable of moving through the sector, in what strength, and toward what objective. It should also indicate which avenues of approach and mobility corridors the enemy is most likely to choose. In cases where the enemy has several maneuver options, the analysis must identify each of these options. Looking at it from the enemy commander's perspective, the S-2 must also identify the point at which he must make a decision to move from one corridor to another.

A thorough analysis of enemy maneuver possibilities is essential if the enemy's weakness is to be found and exploited.

Analyze Direct Fire. A separate overlay may or may not be necessary to the analysis of the task force's direct fire plan and the direct fire capability of each battle position. In this step, the task force's direct fire control measures are highlighted and the approximate ranges of the major weapons in each battle position are drawn. In drawing the range fans, care must be taken to consider any limitations the terrain may impose on a particular weapon system.

The object of this analysis is to identify where direct fires can be massed based on the identified avenues of approach and mobility corridors. It is worthwhile at this point for planners to note also what type of weapons can be massed on which target reference points (TRPs). This information will come in handy later in analyzing whether the obstacle intent and force allocation are compatible.

Integrate the Obstacle Intent. Developing the tactical obstacle intent is a critical step that should involve the participation of at least the task force commander, the S-3, and the engineer. The S-2 should be within earshot to help answer questions regarding the enemy's anticipated maneuver scheme and reaction to the task force's obstacles.

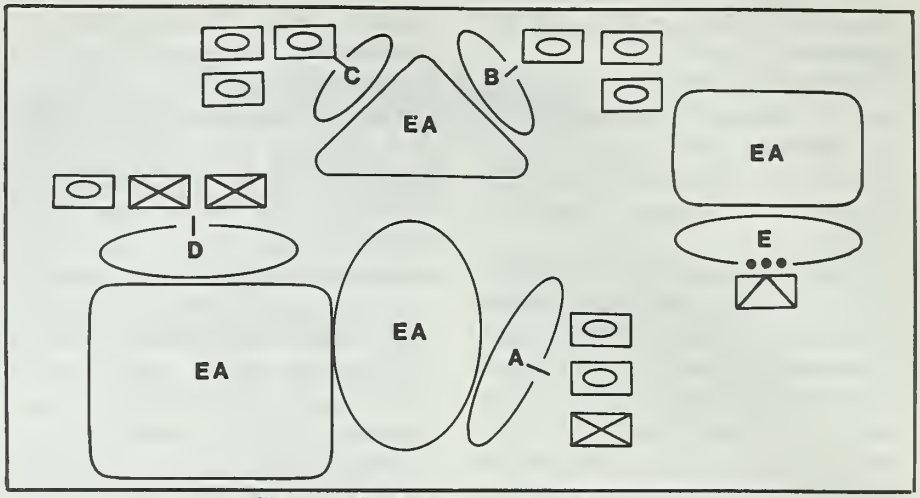

Figure 1. Scenario maneuver graphics.

The object of this step in the obstacle planning process is to use the previous analysis of enemy maneuver and friendly direct fires to decide which obstacle effects can be applied to support the direct fire fight. Accordingly, both the situational template and the maneuver graphics should remain posted on the map along with a new piece of acetate for the obstacle intent graphics.

The commander, the S-3, and the engineer wargame the enemy's maneuver through each likely mobility corridor and decide the obstacle effects desired and the locations where they will cause the enemy to maneuver to the force's advantage. Then, each obstacle effect is indicated on the map using the appropriate graphic symbol (Figure 3).

Once a solid draft of an obstacle intent has been developed, the staff may want to re-wargame each likely enemy course of action, concentrating on the direct fire fight. Then, the obstacle effects must be considered in light of the types of weapons being used. Sometimes a weapon system that can cover both an obstacle and its effect may not be the most suitable weapon. TOWs, for instance, may be excellent to cover dis-

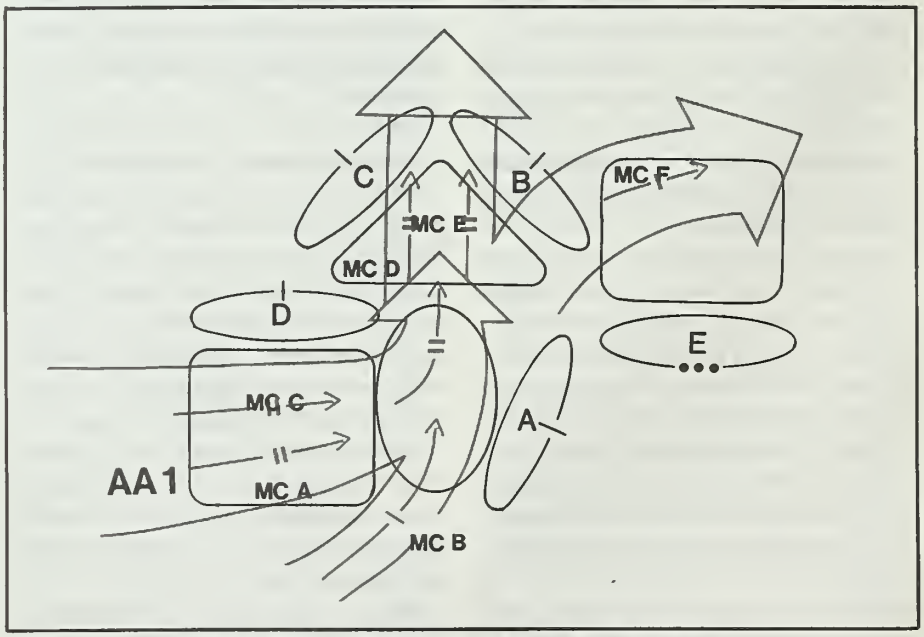

Figure 2. Situational template and maneuver graphics.

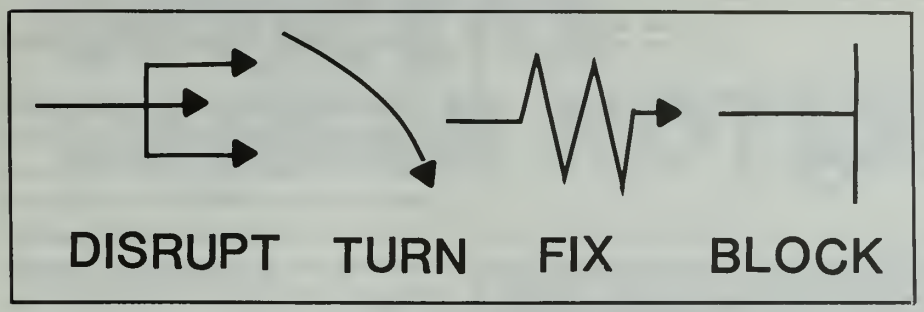

Figure 3. Graphic symbols for obstacle effects.

rupting obstacles that are forward in an engagement area, and their long range may offer excellent standoff. If the fields of fire are good and the enemy is expected to be in march column, the TOW gunner will have more than enough time to acquire the target. But TOWs may not be the most suitable weapon to cover a *fixing* obstacle system where the targets must be acquired rapidly and with a sustained high volume of fire.

Allocate Engineer Effort. First, allocating effort must not be confused with establishing priorities. If the commander designates an obstacle or obstacle subsystem as a high priority, the engineer must then ensure that, if there is a shortage of resources, all of his efforts will shift to the emplacement of that obstacle. Effort allocation, on the other hand, tells the engineer where the commander wants him to weight his efforts to support the obstacle intent. Depending on the mission, the terrain, and the commander's intent, therefore, the engineer's main effort may or may not be applied to the highest priority targets.

Maneuver commanders seem more comfortable using percentages to allocate the available engineer effort. Since an engineer estimate should already have been made by now, the percentages translate easily into meters of minefield, wire, tank ditches, and the like. This type of effort allocation also helps the engineer design the obstacle systems and enables him to begin moving materials and forces from the engineer forward supply point to more forward locations in accordance with the commander's effort allocation.

Design the Obstacles. At this point, the task force commander and the S-3 have given the engineer about all the guidance he needs to develop an obstacle plan. A generic minefield symbol is often used to represent the obstacles. This is not to say the minefields are the only type of obstacles that can be used to achieve the desired effects. In the case of blocking obstacle subsystems, a wide variety of obstacles must be employed to defeat the diverse breaching equipment available to the enemy. But using graphics to illustrate the desired obstacle effect helps the staff develop an obstacle plan. Moreover, the effects of each obstacle or obstacle subsystem are mutually supportive, bound by a single intent.

When he completes a tentative obstacle plan, the engineer must coordinate it with the commander and the S-3 for approval. He should have the maneuver plan, the obstacle intent graphics, and the obstacle plan all posted for one final mental wargame before receiving approval. He may also find it helpful to have the situational template handy in case questions arise regarding the enemy's maneuver options.

Identify Mobility Requirements. The aim of this step is to identify all possible task force requirements for routes through the obstacle systems so that proper lanes can be constructed, marked, manned, and closed.

This process must involve, at the very least, the S-3 (tactical repositioning), the S-2 (withdrawal of scouts and counterreconnaissance forces), and the S-4/executive officer (logistical package routes).

Many argue that mobility requirements should be identified before the obstacle plan is designed. (Why plan friendly obstacles that will get in the way of friendly maneuver?) I agree that obstacles should not be planned within a counterattack axis and that they should not obstruct a route that has been planned for repositioning forces. If adequate maneuver graphics are used during the obstacle planning process, however, these conflicts will become self-evident when the obstacle intent is being developed.

(Experience at the NTC has shown that friendly minefields rarely cause friendly casualties during a battle. Most friendly mine casualties occur before a battle begins, either during the preparation of a sector when a heavy volume of traffic is spread randomly throughout the sector or during the withdrawal of a counterreconnaissance force. Most of the vehicles in the sector during the preparation phase are support vehicles that have, at best, decentralized command and control.)

This step begins with the planners identifying where vehicles must move from and to; then, they designate the routes and mark the obstacle lanes where necessary. Any other planning procedure puts the cart before the horse, because an obstacle plan that is designed or modified to satisfy all movement requirements, particularly administrative ones, no longer focuses on the direct fire fight, and it will fail.

On the obstacle overlay, lanes are indicated where they are needed. The grid for the locations of planned lanes need not be recorded, because it will probably change. Instead, the maneuver company commander responsible for sighting in the obstacles should also sight in the lanes. His company should be assigned the mission of manning an obstacle passage contact point through which traffic must pass, and he should be updated on the location and status of the lanes. This same commander, in his sub-unit instructions in the task force OPORD, must also be given the specified mission to close the lanes.

Prepare the Scheme of Obstacles Overlay. The final product of this planning technique combines the obstacle intent graphics and the obstacle plan into one (Figure 4). Specific instructions may be added if they are critical to the effective integration of the obstacles or to the accomplishment of the commander's direct fire/obstacle intent and if they are not already clear in the graphics. These remarks may be more appropriate if a blow-up representation of the scheme of obstacles overlay is used during the

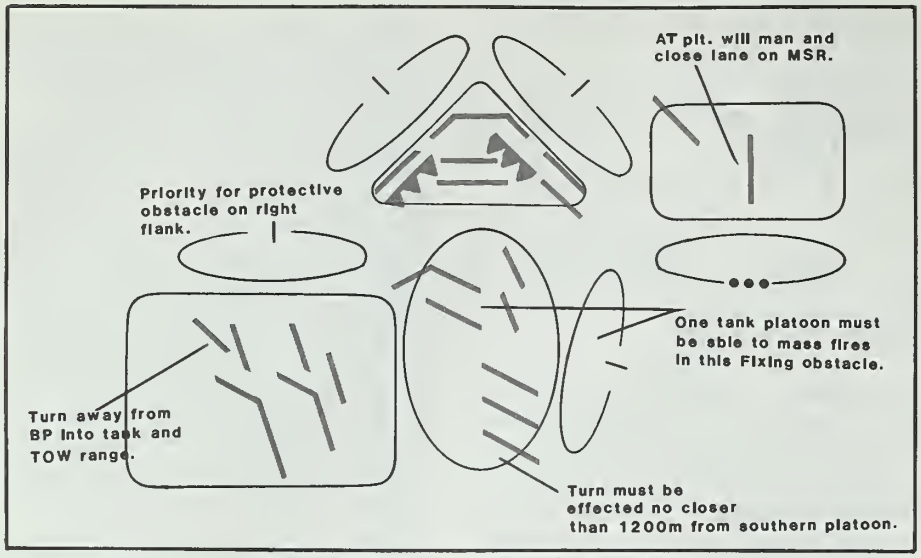

Figure 4. Scheme of obstacles overlay.

OPORD presentation.

This combined overlay is absolutely critical to the company commander during his own defensive planning and during his final obstacle sighting and engineer coordination. It gives him a tool that expedites the integration of obstacles into his own plans, and it tells him what the task force is trying to achieve with the obstacles, and also how and where. If the company commander has it posted on his map and uses it as he plans the organization of his battle position and engagement area, the integration of obstacle effects with the company's fires begins immediately.

This is the beginning of true obstacle integration at the company level. The obstacles overlay helps maintain a high level of integration during the obstacle siting process, and it gives the company commander and the engineer platoon leader a common ground upon which to judge the value of a given obstacle. Moreover, it gives them a basis upon which to make any obstacle changes that may be necessary.

The final level of obstacle integration is reached when the company commander uses the obstacle plan with its intent in his own OPORD presentation. This allows his platoon leaders to understand what the obstacles to their front are doing for the task force. They, in turn, better appreciate how essential their platoons' fires will be to the success of the overall obstacle plan. This final level of integration is completed when company and platoon TRPs, trigger lines for shifting fires, and fire commands are adjusted to make the most of an obstacle's effect. (Both obstacle and intent should be noted on all range cards.)

Complete obstacle integration can be measured only during a battle. But if small unit leaders understand the obstacle intent, they will be better able to carry out the scheme of maneuver.

Captain Brian G. Watson, an Engineer officer, recently completed an assignment as an observer-controller at the National Training Center and is now assigned to the U.S. Army Engineer School at Fort Leonard Wood. He is a 1982 graduate of the United States Military Academy.

OFFICERS CAREER NOTES

ORB CORRECTIONS

Infantry Branch continually receives calls from officers who are trying to update the information on their Officer Record Briefs (ORBs). While we want to do everything possible to make sure an officer's file is current, our operation is often severely degraded by our efforts to do so.

Before calling us to make ORB corrections, please make every effort to allow your installation military personnel office (MILPO) to do its job in this area. Ideally, you should update your ORB during your birth month. But regardless of when you do it, follow up by returning 30 days later to verify that the changes have been recorded. And if you note the name of the person who takes the corrections on your initial visit, you can deal with that same person when you return.

If MILPO staff members tell you they cannot make the changes, call your branch assignment officer immediately (from the MILPO) so that we can resolve any problem with the staff directly, while you wait.

PLAYING TELEPHONE TAG

If you have tried to call Infantry Branch lately, you know it is frustrating. You spend hours trying to get an AUTOVON line, then you are either put on hold, or the receiver is left resting on someone's desk while you wait for an assignment officer to become available.

Assignment officers know that talking to officers on the telephone should take priority over all other activities. On an average day, though, each assignment officer handles between 60 and 75 calls. If you multiply that by 13 assignment officers, 8 civilian technicians, and 10 to 15 minutes for each call, you can see the problem.

FY 1991 IOAC CLASS SCHEDULE

CLASS	REPORT DATE	START DATE	END DATE
91-01	28 Oct 90	29 Oct 90	04 Apr 91
91-02	27 Jan 91	28 Jan 91	18 Jun 91
91-03	17 Mar 91	18 Mar 91	06 Aug 91
91-04	28 Jul 91	29 Jul 91	19 Dec 91
91-05	25 Aug 91	26 Aug 91	31 Jan 92

The following are some pointers that should help you get your call through more readily:

- Call only members of *your* assignment team. If the number is busy or does not answer, calling another team's number will not make your team available any sooner. (A roster of Infantry Branch telephone numbers appears in the November-December 1989 issue of INFANTRY.)
- The last two days of the week are usually the busiest and, as you may have guessed, the period between 1400 and 1830 is the busiest time of day. Because of the tremendous traffic problem in the Washington area, the civilian staff members generally leave around 1530 or 1600, and fewer people are left to answer your calls.
- Schedule your call according to Eastern time. Although schedules vary, the Lieutenant-IOAC team is available beginning at 0530 each day, and each of the other teams generally has someone available by 0600. All teams have someone available each day until 1800. Some often stay longer. The best time to get through is when all branch personnel, both civilian and military, are present—0730-1200 and 1300-1600. (After 1600, getting through is difficult because there are 21 phone lines and normally only 11 assignment officers available to answer them.)
- Ask to talk to your assignment officer only if you must. (The only issues you need to discuss with him are those that directly involve an assignment action.) The technicians are responsible for ORB and administrative updates, and since they also distribute the mail, they are best able to tell you the status of documents received.
- Holding the line for an assignment officer is not a good idea. Instead, please leave a telephone number where you can be reached and a brief note of what you want to discuss. If your assignment officer does not return your call within a reasonable time (the same day), call him again before close of business, Eastern time.
- Please be patient. Although talking to officers is our highest priority, it is only a small part of the assignment process, and there are times when your assignment officer is not available.

Your fellow officers at Infantry Branch are working for you. Rest assured that our goal is to provide you with the best professional development opportunities available.

ASI REQUIREMENT CHANGED

The Army TRADOC Analysis Command has changed the qualifying requirements for additional skill identifier (ASI) 4B, operations research/systems analysis (ORSA), for officers who are not in Functional Area (FA) 49, ORSA.

To be awarded the ASI, these officers will now complete the three-week ORSA Military Skills Development Course instead of the 14-week ORSA Military

Applications Course presented at the Army Logistics Management College at Fort Lee. A bachelor's degree is still required, but an extensive mathematics background is no longer necessary.

These changes are expected to increase the number of officers who have this ASI. Those in FA 49 will continue to attend the 14-week course.

ARMY ACQUISITION CORPS PROGRAM

The Army Acquisition Corps Program (AACP), created in October 1989, encompasses the joint military and civilian management of acquisition specialists.

Infantry Branch has received its target goals for every year group, and a centralized board will select the officers for the program. The functional areas affected by AACP are Research and Development, Nuclear Weapons, Systems Automation, and Contract Acquisition and Procurement.

An Acquisition Officer Selection Board (AOSB) and the first of four PERSCOM Acquisition Accession Boards (PAABs) met in March 1990. The AOSB screened officers in Year Groups 1965 to 1970 while the PAAB reviewed and selected officers' files from Year Groups 1971 to 1975 and 1983. Three subsequent PAABs will meet between June and August 1990 to screen and select officers from the remaining year groups.

Instead of the normal command-track infantry assignments, AACP officers will receive repetitive acquisition assignments that will prepare them to serve as systems managers, product managers, and project managers in the future.

To meet the needs of the AACP and the Army, we must ensure that we grow a pool of qualified infantry officers to design and build the weapon systems of the future.

The point of contact at Infantry Branch is Captain Barclay, AUTOVON 221-5517/0207.

1990 MAJORS PROMOTION BOARD

The 1990 Army Competitive Category Majors Promotion Board is tentatively scheduled to convene from 21 August until 5 October 1990.

The captains who will be considered include those with active duty dates of rank (ADORs) as follows:

ZONE	ADOR (inclusive)
Above the Zone	1 Jun 84 and earlier
Promotion Zone	2 Jun 84 to 1 Apr 85
Below the Zone	2 Apr 85 to 1 Mar 86

All officers who will be considered should obtain and read the PERSCOM message entitled "Zones of Consideration for the FY 90, Army Competitive Category Majors Promotion Board." All Personnel Service Centers and MILPOs should have received copies of this message in April 1990.

The message contains detailed information on the zones of consideration; guidance on complete-the-record and promotion officer evaluation reports, including required through dates; requirement for promotion officer record brief updates; official photograph information; and information regarding the submission of letters to the president of the board. It also contains information for rating chain officials to use in preparing optional and mandatory reports along with suspense dates for the receipt of documents at PERSCOM.

All officers in the zone of consideration must ensure that their records are up to date. Last year's selection rate for infantry officers was 66.1 percent, and it is expected to drop 2 to 4 percent this year.

The point of contact at Infantry Branch is Captain McNulty at AUTOVON 221-5520/5973.

BOOK REVIEWS

The Osprey Publishing Company of London, England has sent us the first two books in its new CAMPAIGN SERIES, which—according to the general editor, David G. Chandler—will present "concise, authoritative accounts of the great conflicts of history." Each is 96 pages in length; each is filled with excellent graphics and a tightly written narrative:

• NORMANDY 1944: ALLIED LANDINGS AND BREAKOUT. By Stephen Badsey. Campaign Series Number 1. Osprey, 1990. No U.S. dollar price listed.

• AUSTERLITZ 1805: BATTLE OF THE THREE EMPERORS. By David G. Chandler. Campaign Series Number 2. Osprey, 1990. No U.S. dollar price listed.

Each volume concludes with a brief guide to the battlefield today and detailed notes to wargamers.

One brief note for U.S. readers concerning the Normandy book—most of the narrative reads as though it could have been written by the long-dead Field Marshal Bernard Montgomery.

Osprey has also sent us several of its other series publications:

• GERMAN COMMANDERS OF WORLD WAR II. Text by Anthony Kemp, color plates by Angus McBride. Men-at-Arms Series 124. Osprey, 1990. 40 Pages, Softbound.

• ALLIED COMMANDERS OF WORLD WAR II. Text by Anthony Kemp, color plates by Angus McBride. Men-at-Arms Series 120. Osprey, 1990. 40 Pages, Softbound.

• SOLDIERS OF THE ENGLISH CIVIL WAR (2): THE CAVALRY. Text by John Tincey, color plates by Angus McBride. Elite Series 27. Osprey, 1990. 64 Pages, Softbound.

We have received from the Macmillan Publishing Company two more entries in its popular Great Battles series. Both maintain the high standards set by their predecessors and are welcome additions to the library of military literature:

• GREAT BATTLES OF THE CIVIL WAR. By John Macdonald. Macmillan, 1988. 200 Pages. $39.95.

• GREAT BATTLES OF WORLD WAR I. By Anthony Livesey. Macmillan, 1989. 200 Pages. $39.95.

Two very fine bibliographies have also come our way within recent months. These are most useful publications, and we commend them to your attention and use:

• SHIELD OF REPUBLIC/SWORD OF EMPIRE: A BIBLIOGRAPHY OF UNITED STATES MILITARY AFFAIRS, 1783-1846. Compiled by John C. Fredriksen. Greenwood, 1990. 446 Pages. $65.00. It covers the first 60 years of U.S. military history.

• MILITARY AND STRATEGIC POLICY: AN ANNOTATED BIBLIOGRAPHY. Compiled by Benjamin R. Beede. Greenwood, 1990. 360 Pages. $55.00. Its emphasis is on the post-1960 era and, in particular, the years following the U.S. involvement in the wars in southeast Asia.

A most interesting little book printed in the Soviet Union has come to us by way of Hippocrene Books (1990. 94 Pages. $5.95, Softbound). It is A RUSSIAN IN THE U.S. ARMY, by Artyom Borovik, a Soviet journalist who spent considerable time in Afghanistan covering the war there for the Soviet press. He is now a staff writer of *Ogonyok*, a popular Soviet weekly magazine.

During the summer of 1988, the author spent almost a month at Fort Benning as part of an exchange program. Here are his views on what he saw and whom he talked with. He and his publisher have put together a good story, and it is a book for all of us to read.

There are a number of other books we want you to know about:

• THE TRAINING OF OFFICERS: FROM MILITARY PROFESSIONALISM TO IRRELEVANCE. By Martin van Creveld. The Free Press, 1990. 134 Pages. $19.95. This particular author has never thought much of the U.S. Army's officers and soldiers. Apparently, he thinks less of the officer corps today. Although he pretends to be writing about officer education in all major armies, this book attacks the U.S. Army's present officer school system. In fact, the subtitle of his book pretty much sums up his feeling about that system. Criticism is never easy to take, but it is particularly hard to take from a writer who knows so little about his subject.

• PUBLIC AFFAIRS: THE MILITARY AND THE MEDIA, 1962-1968. by William M. Hammond. A volume in the UNITED STATES ARMY IN VIETNAM SERIES. USGPO S/N 008-020-01122-3, $23.00, Hardbound. Center of Military History, United States Army, 1988. 436 Pages. This book has no more reason for being in the Army's official Vietnam War series than a book on volleyball. It is poor history at best; the Army as such is barely mentioned; the communication media are defended no matter what they do; and the Johnson Administration's public relations policies are continually excoriated. If anything, this book should have been published by the U.S. Joint Chiefs of Staff, the U.S. Department of Defense, or the U.S. Department of State, for that is the level at which it was written. Hopefully, the follow-on volume will be looked at more closely before it is published.

• A SHORT HISTORY OF THE KOREAN WAR. By James L. Stokesbury. Morrow, 1988. 276 Pages. $18.95. If you have only a hazy knowledge of

the Korean War, this is the book you want to use to refresh your memory. If you have little or no knowledge of that war, this is where you want to start your reading. The book is well written, and the author has no axes to grind. He covers the entire war, offers "lessons learned and unlearned," and suggests further reading. An excellent piece of work.

• THE ENLIGHTENED SOLDIER: SCHARNHORST AND THE *MILITARISCHE GESELLSCHAFT* IN BERLIN, 1801-1805. By Charles E. White. Praeger, 1988. 264 Pages. $42.95. Gerhard Johann David von Scharnhorst was not Prussian by birth. He was a Hanoverian who in early 1801 transferred to Prussian service in Berlin. He is generally considered the founder of the modern German Great General Staff, and in this book, a refinement of his doctoral dissertation, the author tells us how and why Scharnhorst was able to do what he did in a country that was ruled by an absolute monarch and whose aristocracy did not believe in either work or education. He also describes the establishment and operation of the military society in Berlin—a volunteer society at the beginning to discuss military affairs—whose purpose as Scharnhorst saw it was "to instruct its members through the exchange of ideas in all areas of the art of war, in a manner that would encourage them to seek out truth." The author also tells us of the various other educational activities his subject was involved in, but he emphasizes the fact that Scharnhorst was a very capable battlefield commander. All in all, this is a fine piece of work.

• BATTLE FOR STALINGRAD: THE 1943 SOVIET GENERAL STAFF STUDY. Edited by Louis Rotundo. Pergamon-Brassey's, 1989. 340 Pages. $47.00. This is the second such study that we have mentioned in our book review section. This particular study was prepared and issued by the Soviet General Staff as Study Number 6 in 1943. It represents a thorough operational analysis with significant tactical instructions on one of the most important military campaigns of World War II.

• MACHINEGUNS: A PICTORIAL, TACTICAL, AND PRACTICAL HISTORY. By Jim Thompson. Paladin Press, 1989. 238 Pages. The author has written his book primarily "on the assumption that anyone who buys this text is interested in actually shooting or owning automatic weapons, or is pondering such an expenditure." He admits there are more comprehensive machinegun books, but he feels his own book offers something they do not—practical information, enough history to understand a particular machinegun's use, and a great amount of useful information about ammunition. All Infantrymen should enjoy this one.

• GUNS OF THE ELITE: SPECIAL FORCE FIREARMS, 1940 TO THE PRESENT. By George Markham. Sterling, 1989. 184 Pages. $17.95, Softbound. The author tells us of the many weapons that special force-type units around the world have used since 1940. The book is divided into sections that describe handguns, machineguns and submachineguns, rifles, sniper rifles and sights, and support weapons. More than 250 photographs, line drawings, and diagrams illustrate the text. The author includes special how-to-fire sections, a special study of the Kalashnikov, and his opinions on the merits and faults of the various firearms and their ammunition. Another one for the Infantryman.

• COMMUNICATIONS EQUIPMENT OF THE GERMAN ARMY, 1933-1945. By Charles J. Barger. Paladin Press, 1989. 179 Pages, Softbound. A comprehensive reference on the tactical field equipment used by the German Army between 1933 and 1945. It covers such items as field telephones, transmitters, receivers, switchboards, and accessories. It also offers operating instructions for the various models of equipment. This book should be of great interest to the military historian, the military collector, and the radio enthusiast.

Now here are some of our longer reviews:

THE WAR FOR SOUTH VIETNAM, 1954-1975. By Anthony James Joes (Praeger, 1989. 176 Pages. $39.95). Reviewed by Doctor Joe P. Dunn, Converse College.

This book fills a niche in the increasing number of texts coming out on the Vietnam War—a short, readable volume for the novice student written from a "revisionist" (i.e., conservative centrist) perspective.

It has many strengths: It is quite accessible for the non-specialist; it attempts to cover the background in Vietnamese history and politics and the long origins of the conflict that are necessary to an understanding of the context of U.S. involvement; it affords balanced insight into the contending military forces without the romanticized cliches abundant in many accounts of the communist guerrillas; it incisively critiques inadequate U.S. military strategy and tactics; it challenges the "prevailing wisdom" on many issues; and it has a provocative conclusion.

The book does have certain weaknesses. For example, the author is not a Vietnam specialist. His book is based entirely upon secondary sources and his bibliography has some curious omissions. And while he perceptively confronts well established shibboleths, he tends toward the same absolute certainty that he challenges in those with different perspectives.

In sum, this is a useful book, one in line with new revisionist writings such as Phillip B. Davidson's *Vietnam at War* (1988) and F. Charles Parker IV's *Vietnam: Strategy for a Stalemate* (1989). Its price, however, is outrageous.

THE FORGOTTEN VICTOR: GENERAL SIR RICHARD O'CONNOR. By John Baynes (Brassey's [UK], 1989. 320 Pages). Reviewed by Major Harold E. Raugh, Jr., United States Army.

British Army General Sir Richard O'Connor was largely responsible for the first significant British military victory in World War II—Operation *Compass* (December 1940-February 1941—during which his 32,000-man Western Desert Force in North Africa advanced more than 500 miles, destroyed an Italian army of ten divisions, and captured

more than 130,000 prisoners and a vast amount of equipment. In April 1941, at the height of his power, O'Connor was captured. By the time he escaped in December 1943, he had already faded into obscurity and since then has been undeservedly relegated to history's hinterland.

Born in 1889, O'Connor was commissioned into the British Army in 1909. During World War I he served both on the Western Front and in Italy. During the inter-war years, he filled a number of leadership positions, all of which culminated with his command of the 7th Division in Palestine in 1938-1939.

On 17 June 1940, the day France made peace with Germany, O'Connor was promoted to lieutenant general and confirmed as commander of the Western Desert Force.

Following his escape, in January 1944 he was given command of the VIII Corps, which he led through some of the hardest fighting in Normandy.

He was reassigned to India in December 1944, promoted to full general in April 1945, and returned to England in June 1946 to serve as Adjutant General of the Forces. Always concerned with the morale and welfare of the soldiers, O'Connor argued against a plan to reduce the number of men being sent home from the Far East for demobilization. Overruled by the Army Council, O'Connor submitted his resignation, expecting the full support of the Chief of the Imperial General Staff, Bernard Montgomery. But that support was not forthcoming, and O'Connor was forced into retirement.

He served as Colonel of his Regiment and remained active in a number of other military and religious activities before his death in 1981.

John Baynes, a noted British military writer, has done a fine job with this book, the first full length biography of O'Connor. He has succeeded in capturing this charismatic warrior's personality, but is rather too kind in his assessment of the effect O'Connor's 32-month imprisonment had on his subsequent military performance. His well-written text is supplemented superbly by 45 fascinating photographs and 12 easy-to-understand maps.

THE SOLDIER'S WAR, 1914-1918. By Peter H. Liddle (Sterling, 1989. 256 Pages. $29.95). Reviewed by Colonel David A. Rolston, United States Army.

This is the last of three volumes on the men who fought World War I. The first two covered the war at sea and in the air. This one, of course, deals specifically with ground soldiers.

The author's purpose is to relate to the reader what the war was like for the individual soldier in the trenches. Accordingly, he focuses on the regiment and below and understandably disregards strategy and politics except where they had a direct effect on the thoughts and morale of the front-line soldiers.

Diaries, letters, photographs, and interviews—the author uses all of these to piece together a picture of everyday life. From going over the top to regimental smokers, nearly every aspect is touched. Troop riots, brothels, drunkenness, and self-inflicted wounds are counter-balanced by heroics, daring exploits, and dedication to the regiment.

This is a well-written book, generously filled with photographs, that should be of interest to the military reader. Unfortunately, by covering all of the war's different theaters, the author has had to limit his discussion on specific campaigns and fronts. But he made the correct choice, and this has resulted in totally enjoyable and informative reading.

BROWN WATER, BLACK BERETS. By Thomas J. Cutler (Naval Institute Press, 1988. 425 Pages. $21.95.) Reviewed by Leroy Thompson, Manchester, Missouri.

Although several histories have been written and published about the Navy's riverine forces during the Vietnam War, they have tended to be little more than broad overviews. This book spotlights the sailors who made the riverine forces work. At the same time, the author manages to do a good job of describing the strategical goals that determined the riverine mission.

Although the book deals with sailors, their experiences will not seem unfamiliar to infantrymen. Search and clear operations, helicopter-supported sweeps, ambushes and counterambushes—these and many other types of operations carried out by the riverine forces were tactically similar to those carried out by infantrymen throughout Vietnam.

Of particular interest to the Army reader is the section that deals with the Mobile Riverine Force's operations with the 9th Infantry Division in the Mekong delta. The evolution of the tactics used and the adaptation of naval and army logistical systems to fit the combined mission showed a remarkable flexibility and willingness to make things work.

Lessons learned during the Civil War and later in China had to be relearned or updated to face this new riverine war. It is important, therefore, for infantrymen today to remember the lessons cited here, for they may well find themselves in the future fighting along waterways similar to those encountered in Vietnam.

The book is highly recommended. It is sound military history mixed with good "there I was" yarns, always a hard combination to beat.

TREAT 'EM ROUGH: THE BIRTH OF AMERICAN ARMOR, 1917-1920. By Dale E. Wilson (Presidio Press, 1989. 257 Pages. $24.95). Reviewed by Captain David Niedringhaus, United States Army.

The United States Army has had a heavy tank and mechanized force orientation since World War II, and the performance of U.S. tank units and the development of tank doctrine during that time has been well documented. Until now, however, there has been no comprehensive account of the inception, early development, and initial combat performance of U.S. tank units during World War I. That void has now been admirably filled by this book.

The author, a serving U.S. Army

officer, presents a straightforward chronicle of the Army's efforts to become familiar with a strange new way of waging war after the country's entry into the war in 1917. He tells a fascinating story, which is made more intriguing by the prominent role that two young Army captains—George S. Patton and Dwight D. Eisenhower, played in the training of U.S. tankers and in the development of early U.S. tank doctrine.

Patton's contributions, in particular, were monumental. The first U.S. soldier officially assigned to duty with tanks, he was appointed to head the AEF's Light Tank School at Langres, France. In this role, Patton had an opportunity to make recommendations about unit organization, armament, training, and tactical doctrine that would eventually form the basis of U.S. tank employment during the 1918 fall offensives.

Eisenhower, meanwhile, back in the United States, commanded a tank training center at Gettysburg, Pennsylvania, which was responsible for seeing that prospective tankers received adequate training despite the fact that there were, initially, no tanks available to train them on. By the end of the war, Eisenhower was a lieutenant colonel, and his post—Camp Colt—at any given time was home to more than 10,000 enlisted soldiers and 600 officers.

The author has incorporated a wide range of primary sources, and the book contains a superb collection of previously unpublished photographs. It also has a large number of maps, but many of them, unfortunately, are of marginal value at best. This, along with the author's tendency to use the same phrases repeatedly, is annoying but is not a significant flaw. Overall, it is a valuable and informative book.

NAPOLEON AND HITLER: A COMPARATIVE BIOGRAPHY. By Desmond Seward (Viking Penguin Press, 1988. 319 Pages. $19.95). Reviewed by Colonel John C. Spence III, United States Army Reserve.

Napoleon's invasion of Russia on 23 June 1812, and Hitler's invasion of Russia on 22 June 1941, form only one of the many intriguing parallels between these two warlords. Many other comparisons are drawn in this short, but fact-filled book.

Both men rose from relatively meager beginnings. Each had an insatiable lust for power. Each skillfully manipulated the existing military establishment to consolidate his own power. Each demanded and commanded the total allegiance of their subordinates. Once in power, each arrogantly disregarded the sound military advice of professional officers.

Each engaged in coalition warfare by using troops from satellite states to attack Russia. Each maintained irrational concepts of victory, even when total defeat was imminent and apparent. Finally, as a result of their unlimited ambitions, each left Europe in ruin and chaos.

Desmond Seward, a British writer, does describe the many parallels in the careers of the two men. But, as he correctly points out, the contrasts should be considered as well as the comparisons. Above all, Seward draws careful moral distinctions between Napoleon and Hitler. Although each recklessly sent soldiers into combat to meet certain death and maiming, Napoleon was not the genocidal maniac that Hitler was.

Finally, it should be noted that while Napoleon died in exile and disgrace, his legacy was not altogether negative. The Corsican gave the French people a legal code and an administrative political structure that endures to this day. His remains rest in honor at the Hotel Des Invalides in Paris. On the other hand, the Austrian corporal left a legacy of death, destruction, and a division of Europe that is only slowly being overcome today.

GEORGE B. McCLELLAN: THE YOUNG NAPOLEON. By Stephen W. Sears (Ticknor and Fields, 1988. 482 Pages. $24.95). Reviewed by Major Don Rightmyer, United States Air Force.

General George B. McClellan was probably the most controversial general serving during the Civil War, particularly on the Union side.

The author, a well known writer on Civil War affairs, has brought together this new biography of McClellan from a varied selection of the general's personal papers and letters, official documents, and the written accounts of numerous participants. It will certainly stand as the authoritative biography on the subject for some time to come.

Sears provides an excellent survey of McClellan's military and civilian careers, as well as coverage of his unsuccessful presidential campaign in 1864 when his opponent was Abraham Lincoln. He provides interesting insights into the ways in which McClellan's reliance on faulty intelligence sources and estimates of enemy strength was allowed to cripple his own planning and campaigning.

Finally, if you have ever wondered why U.S. military personnel are prohibited from participating actively in politics, this book provides a clear explanation.

RECENT AND RECOMMENDED

ABOUT FACE: THE ODYSSEY OF AN AMERICAN WARRIOR. By David Hackworth and Julie Sherman. Touchstone Books. Originally published in hard cover in 1989. Simon and Schuster, 1990. 875 Pages. $14.95, Softbound.

MARCH OR DIE: A NEW HISTORY OF THE FRENCH FOREIGN LEGION. By Tony Geraghty. First published in hard cover in 1987. Facts on File, 1990. 352 Pages. $12.95, Softbound.

DIVISION COMMANDER: A BIOGRAPHY OF MAJOR GENERAL NORMAN D. COTA. By Robert A. Miller. The Reprint Company, Publishers (P.O. Box 5401, Spartanburg, SC 29304), 1989. 202 Pages. $19.00.

THE MAKING OF A PARATROOPER: AIRBORNE TRAINING AND COMBAT IN WORLD WAR II. By Kurt Gabel. University Press of Kansas, 1990. 288 Pages. $25.00.

CAPTURED ON CORREGIDOR: DIARY OF AN AMERICAN P.O.W. IN WORLD WAR II. By John M. Wright, Jr. McFarland and Company (Box 611, Jefferson, NC 28640), 1988. 192 Pages. $20.95.

A TIME FOR GIANTS. By D. Clayton James. Franklin Watts, 1987. 346 Pages. $19.95.

OUTPOSTS AND ALLIES: U.S. ARMY LOGISTICS IN THE COLD WAR, 1945-1953. By James A. Huston. Associated University Presses, 1988. 349 Pages. $39.50.

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From The Editor

ATTENTION AUTHORS

When we accept an article for publication, we always keep your original manuscript intact and make a copy of it to use in our editing process. For that reason, we ask that you submit double-spaced manuscripts whenever possible—they are not only easier for us to read but also easier for us to edit.

Lately, we have received a number of computer-produced manuscripts printed on dot-matrix printers, and these are often too light to produce legible photocopies. When we accept such an article in the future, we may ask you to run another copy for us to use in editing, assuming you still have it on a disk.

Nevertheless, we are willing to read any kind of manuscript you are able to send us, and to deal with its editing in any way necessary once we have accepted it. We value your ideas too much to be excessively demanding in the way you present them.

BACK ISSUES

We have a number of 1986, 1987, and 1988 issues on hand and offer them to you at $1.50 per copy mailed to a U.S. or an APO address. (Foreign addressees must add $1.00 per copy to cover surface mail charges.)

If you will let us know the particular issues you want, we will do our best to get them to you. A few of the back issues are in short supply, so please get your requests to us as soon as possible.

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